

# SUPPLEMENT.

# The Mining Journal,

## RAILWAY AND COMMERCIAL GAZETTE:

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

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### Original Correspondence.

#### THE MINES AND WORKS OF GERMANY.—No. VII.

##### IRON SMELTING IN THE ERZGEBIRGE.

"When Virgil was chanting his pastoral lays in sunny Italy, and great Caesar was thundering in war" amidst the barbarous tribes of Britain, Saxony was the home and centre of all that was known and practised of the art of smelting ores in those early times. Buried in the mountain districts of central Europe, the Bohemians and the Saxons have sought, in the pursuit of mining and metallurgy, that arena for the exercise of their powers which other nations have found in political convulsions, or in military conquest. Iron smelting was carried on here, in a rude and barbarous fashion, as early as in the fourth and fifth centuries before Christ; and Caesar speaks of the swords manufactured in these forests as a well-known production, and one highly appreciated by the uninventive Romans.

At first the attempts were rude and simple. A few stones enclosed a small circular space on the hill side; the neighbouring wood supplied the fuel, and the winds of heaven the blast. Next, a small hearth was constructed, 3 or 4 ft. high, blown by great skin bellows, worked by hand. Then enlarged hearths were invented, known as *stockföns*, and the large bellows were worked by water-wheels; and, lastly, the modern furnace, with all the aids and methods perfected in the nineteenth century. The South Germans have been all along the pioneers of European metallurgy. It was, therefore, with something more than commercial interest that we visited the famous seat of the Saxon iron smelting. Every town, every process, custom, and phrase in the German iron trade abounds in historical interest.

Through the courtesy of Herr Buschmann, of Zwickau, we were introduced to the manager of the ironworks in the immediate neighbourhood, and were received with the utmost urbanity, and at once allowed every facility of inspection.

The first point that struck our attention was the large variety in the ironstone used. Six or seven different ores were brought together, to be combined in the furnace, much on the same principle as our spirit merchants make their famous blends. The quality of the pig-iron, we were assured, was just the sum of the qualities known to result from the use of each ore separately; and that the furnace manager, himself a thoroughly practical chemist, varied the ingredients from time to time, according to the required quality of the iron. The pigs being intended for consumption on the spot, and by the same firm, the ore mixtures in the furnace were effected with a direct reference to the object to be served by the finished iron, and were, to this end, controlled to the greatest nicety. Though these principles of mixing ores are admitted in England, and to some extent acted upon, the subject is far from receiving that amount of attention which it merits. The different ores actually in use on the day of our visit were the following:—

1. A sesqui oxide, somewhat resembling our Oxford ore, but containing few, if any, fossil remains. It is obtained from mines in the Thuringian forest, some 30 miles away, and brought here by rail. It yields on analysis 45 per cent. of iron.

2. A clay carbonate of iron, called schwartzaber, and containing 35 per cent. of iron.

3. Spherosiderite, a most valuable ore of iron, found in the Saxon coal measures. This mineral is found in nodules, most of them having in their centres organic remains. Neuropterus and pectopteris seemed the most common. From its external appearance, and the character of its fossils, this ore has a remarkable resemblance to the celebrated blue flatts ironstone of the South Staffordshire coal field. On analysis it yields 65 per cent. of metal, and also traces of ferrocyanide of potassium, which is supposed to exert a favourable influence on the hardness of the iron.

4. A red hematite, darker in colour, but similar in composition and yield of metal, to the Ulverstone ironstone.

The furnaces were at that time producing their common iron. The flux was lime, containing a little fluor-spar, and also a small quantity of calcareous phosphate. This lime being found near, is cheap, but on account of the phosphorus is only used for the common class of iron, whilst a purer variety is employed for the better brands. In the common iron the phosphorus amounts to 0·15 per cent., which is a most injurious amount. There are three furnaces, connected together by a solid mass of brickwork. They are square at the bottom, and slightly tapering up to 20 ft. high. The total height is 58 ft., the breadth being somewhat greater than in the best modern models. The usual form of hoist is employed to elevate the materials to the furnace top; and we observed each barrow load, about 1½ cwt., was itself an intimate mixture of ores, flux, and coke, and not, as is the case very often in this country, consisting of ore, lime, &c., sent up in separate barrows, and tumbled into the furnace to mix as well as they can. The ordinary U-pipes are in operation to heat the blast. The engine is beautifully got up. It consists of two cylinders, of 43 in., and it is worked at 150-horse power. It was built at Schenectady.

Some of the lighter work is here performed by women; about 50 are employed. They break the lime, mix the ores, fill the barrows, &c., and receive two-thirds the wages of the men. The ironstone is calcined in close furnaces, and some of the ores are roasted separately; but throughout every operation the utmost care is taken to ensure perfect homogeneity in the mixtures. They tap every 12 hours, and produce 50 to 60 tons of pig-iron at each casting. These furnaces have been in operation nearly 20 years, and are not considered by the proprietors by any means faultless in their construction; and already they contemplate the erection of others, over 70 ft. high, similar to the recent erections in Belgium and the North of England. But we return to our hotel at Zwickau, thoroughly convinced that in point of the selection and careful combination of the furnace materials, and in the eminent scientific and metallurgical ability displayed in the management, our English blast-furnaces might be sensibly benefitted by the adoption of the practices of the Saxon iron smelters.

As a specimen of low furnace, vigorously conducted on modern principles, we visited a blast-furnace in Belgium, near Liège. These works are situate at Ougre, close to Seraing. They are built on the principle of the old charcoal furnace. The hearth is very small, and the height not quite 40 ft.; but the quality of the iron is second

to none in the market. Their great success seems to us to be chiefly due to the fact that the ore used—a sesqui oxide of iron—contains an intimate admixture of carbonaceous matter, giving it a dark colour, and greatly facilitating its reduction. The ore, locally known as "minett," is mined in the provinces of Luxembourg and Nassau, and is brought down the river in barges. A suitable lime for flux is found near the works. The hot-blast is used, and the fuel is coke. A charge is tapped every eight hours, thus giving three castings per day, which more than makes up for the deficient capacity of the furnaces. The works are now carried on by a company, for whom Herr Schmidt, a German, is managing director. They are said to turn out the finest brand of iron in all Belgium. This natural mixture of carbon in the ironstone is the main cause of its easier reduction, and this it is which makes it admit of being so short a time in the furnace. It also effects the carbonisation of the iron in the furnace nearly as well as though the fuel had been charcoal. In all these features it bears a strong resemblance to the famous blackband ironstone, which has earned so just a celebrity for Scotch iron.

Our visit to the extensive ironworks of Marienhütte, carried on by the Saxon Government, we purpose to describe in our next.

#### MANUFACTURING OPERATIONS IN GLAMORGANSHIRE.

(From an occasional Correspondent.)

PONTYPRIDD is the centre of a rapidly advancing district, and the variety of trade and manufacture carried on therein places it in a condition of good general prosperity. The blowing-in of the first furnace of the works now possessed by the Forest Iron and Steel Company, and the forward condition of the second, introduces another branch of industry into the neighbourhood; and when the whole contemplated establishment of this company is erected, and in full work, it will vastly enhance the value of property therein, and promote that general prosperity which variety of manufacture always ensures.

The site occupied by the Forest Company's furnaces, &c., is very favourable for the laying out of extensive works, and it is closely adjoining the Taff Vale Railway. The Glamorganshire Canal is also in close proximity, and the former proprietors of these (then unfinished) works had a connection with the canal in constant use. There has also been a talk of a branch railway from off the Rhymney Railway, near Caerphilly, to Pontypridd, which branch would pass near to these works, and form a very important link between the latter place (including the Rhondda district) and Newport, and, at the same time, with the London and North-Western and Midland Railways, through the Rhymney, and Brecon and Merthyr Railways respectively. There can be no doubt that such an additional outlet for this district would cause great good to all connected with its trade, and also place the freighters thereof in a much better position than they can otherwise attain.

The new colliery workings that are now being proceeded with on the west side of Pontypridd, by Messrs. Fowler and Co., are also likely to become a marked feature, and a source of much prosperity to the district; and already the question of building a large number of new cottages for the workmen who, it is expected, will be shortly employed in these collieries, is being talked of. With a good coal secured, these workings should become very valuable, as they occupy so good a position in regard to their proximity to market, being only about 12 miles from Cardiff.

The Chain and Anchor Works of Messrs. Brown, Lenox, and Co. are also doing a good trade, and are the source of much prosperity to the district. Under the energetic management of Mr. Penn, every effort is being made to ensure the best results possible.

There is also the Forest Tin-Plate Works, in the full flow of steady and profitable working. These works are exceedingly well laid out, and were erected by the former proprietor, Mr. Francis Crawshay, in his characteristic style, embodying sound and substantial workmanship to the fullest extent. The present proprietors, who are lessees holding from Mr. Crawshay, have added the making of sulphuric acid to the other operations carried on; and everything is being done to ensure economical working; and the utilisation of the products of the "wash-house" by Pugley's patent process is also in operation here.

Then, again, we have the Taff Vale Rail Works, the property of Mr. Richard Fothergill, M.P., which have for a long time been carried on with great regularity; but there seems to be now some little difficulty in ensuring a sufficient supply of fuel with which to carry on full operations. An enlargement of these works is also spoken of, which, if carried out, cannot but largely promote the accession of prosperity to the district.

In addition to the foregoing there are also the Coedpenmain Foundry and Engine Works, the Chemical and Vinegar Works of the Messrs. Chivers, Todd, and Co., the Chemical Works of Mrs. Smith, and the collieries of Mr. R. Rowlands. All these are within the immediate district of which Pontypridd forms the centre; and seeing that some of them are just in their infancy, and others in process of being largely developed, there cannot be a doubt that in a few years the population will be very much larger than it is at the present time.

With these accessions to its material prosperity it may fairly be hoped that the district will be found to be possessed of men who will push on the supply of the educational necessities of the district. These have hitherto been of a most meagre type, and particularly insufficient in quantity; but at last a science and art class has been set-a-going, and for the good of the community it may be hoped that the movement may have a prosperous future. Where the manufactures of a district are so varied, as are those of that of which Pontypridd forms the centre, it must be a matter of the utmost importance that the youths therein should be instructed, in some measure, in the science of their respective arts, and so be taught to seek (and in seeking certainly in some measure to find) pleasure in the performance of their daily allotted tasks, as well as to find therein their source of temporal sustenance. It is only when the mind is engaged as well as the hands, when there is a disposition to find a pleasure as well as a profit in the daily toil, that the whole manhood becomes exerted and developed, and the employer and employee derive the full benefit of their mutual connection.

There are men now connected with the trade of the district who are eminent for their scientific attainments, and who have in other

places shown themselves the generous patrons of educational efforts. Let us hope that the district, in this respect also, may be found reaping a benefit from its extended and new connections.

#### METALLIFEROUS MINES REGULATION ACT.

SIR,—Will you be kind enough to state whether Managers falling under the above Act, are required to hold Certificates equally with Managers falling under the Coal Mines Regulation Act?

Dec. 10.

[The Managers of mines falling under this Act are not required to hold a certificate of competency. The classes of mines which do and which do not come under the Coal Mines Regulation Act (according to the Secretary of State's opinion) were stated in last week's Journal.]

#### THE MINES REGULATION ACT.

SIR,—My attention has been called to a letter which appeared in the Supplement to last week's *Mining Journal*, signed by Mr. W. Stewart, Chairman of the Committee of Yorkshire Coalowners, in which he states that you have been misinformed as to the opinion of the Inspector of Mines for Yorkshire as "to the persons who are to receive certificates as Managers under the Act." The information furnished to you was that the underviewers—those, in fact, in whose hands the entire management of the underground workings were placed—were the parties who were to receive certificates, or be examined for them. Mr. Stewart, whilst denying the statement, does not enlighten us any further. Why he does not do so is, of course, best known to himself. However, a few days since I forwarded a letter to Mr. Wardell, the Inspector, asking whether the first statement was correct or not, but he has not thought well to answer it, although I believe it is usual for Inspectors, who are gentlemen in every sense of the word, to answer letters addressed to them in courteous terms. So, despite Mr. Stewart's assertion to the contrary, I still consider the statement in your article to be substantially correct. If it is not, then most of the leading underviewers in South Yorkshire are labouring under a very serious mistake, and which no time should be lost in correcting.

Barnsley, Dec. 11.

#### COAL MINES REGULATION ACT, 1872.

##### CERTIFICATES OF SERVICE.

SIR,—It would appear that this complicated question is now settled by the decision of the Secretary of State's communication to the several Inspectors, which, as Mr. Hall observes, tallies very closely with his forecast, and also the opinions given by the Inspectors in conference with the Lancashire and Cheshire Coal Association in Manchester a few weeks ago, and also as given by you in your article of Nov. 30, as the views of Mr. Wardell, the Inspector, that the certificated manager will be the underviewer who has charge and control of the colliery workings—those are, in my opinion, the class of men intended by the Act to be managers, and they are also the proper men to fill the office. But I see by this week's Journal Mr. Stewart, of Wakefield, Chairman of the Committee of Coalowners, states, on behalf of that committee, that you have been misinformed as to Mr. Wardell's views. I see you had very properly left out that broad term "viewer," which you, in your article of this week, give as the Secretary of State's decision, that certificates of service will be granted to "viewers" as well as underviewers. This I consider a very wide term, and, speaking generally, means a mine agent, a mining engineer, a consulting engineer, almost any gentleman having in any way the least connection with a mining engineer's office if you like, who, by obtaining a certificate for one colliery, or half-a-dozen collieries, becomes manager for each, and the present staff of foremen, underlookers, deputies, or underground overmen, who have, perhaps, for years been trying to raise themselves by their own exertions, must become his "competent persons," and he can sit in his office if he thinks proper, and those "competent persons" manage the work for him; should anything go wrong, of course the responsibility goes with the holders of the certificate, and also the owner and agent (if any), unless he, the "manager," proves that he had taken all reasonable means by publishing, and to the best of his power enforcing, the rules, as regulations for the working of the mine, so as to prevent such contravention or non-compliance. Now, this is one of the easiest things possible for a gentleman-manager to do, according to the last version of the several terms of the Act.

I will give you my views, Mr. Editor, how I think this so far difficult question might be got over, and leave things almost as they are at present, so long as the Act holds the owner, agent, and manager all three responsible to the same extent, and gives power to the owner to be manager if he likes, and Mr. Hall tells us, in his letter in the Journal, Oct. 22, "To the conduct of a mine the Act does not render an agent in *any* way useful, but only subjects him, if he exists, to certain obligations and liabilities;" and the same author also shows us he cannot exist if the owner becomes manager, and as the words "constant supervision" in the Act is said not to mean constant daily inspection, it must leave it open to the manager to go into the mine when he thinks proper—either once a week, once a month, or once in three months; only the "competent persons" must go see him if he does not go see them. Under these circumstances, why not all owners take the certificate? he can then retain his present staff of officials, who will, by the Act, become his "competent persons," instead of, as at present, his steward, deputies, agent, &c., and he alone, as manager, will be subject to the obligations.

MINER.

#### MINERAL RIGHTS IN THE FOREST OF DEAN.

\* SIR,—No man with a press of business on his hands would think of throwing away precious time and occupying the space in your valuable Journal in endeavouring to enlighten the public upon nothing; and we consider it a great pity if "Forester" knew anything of the case alluded to that he did not state it. There has, however, always been, and still are, to be found idle meddlers in every matter. But perhaps your correspondent is still "out of court upon it;" and he would have been far wiser to have remained in the background, his proper place; and we trust in future, if he is capable of discriminating between right and wrong, that he will occupy himself

with a more worthy cause than to attempt to back up those who unjustly set up claims in order to gratify a morbid and grasping disposition. If "Forester" should again show himself in print (which for his own sake we should certainly recommend him to do) we should suggest to him the propriety of confining himself not to any arguments he may advance which are based upon assumption, but to facts themselves; and if he has forgotten what was stated at the Gaveller's office perhaps he is sufficiently acquainted with that office to get his memory refreshed by enquiries made through the present Crown officials. Is he sufficiently known there, and has he confidence in himself for this? "Forester" would no doubt gain credit and applause to himself if he were to lavish his unappreciated praise upon the high sounding "Forester Horn," trumpeting, as it does, the story of aggrandisement covered up by a mantle of untruths. If "Forester" desires to become champion at the recommendation of the Messrs. Brain, by all means let him show himself boldly and truthfully; and then, if it would not militate against him to print his signature, we shall be happy to present ourselves on equal terms.

ONE WHO KNOWS.

#### GUNPOWDER, LITHOFRACTEUR, AND PUDROLYTHE.

SIR.—I observe a letter from Mr. Twynam in last week's Journal speaking in favour of Pudrolythe. Gun-Cotton has been introduced into our mines as a substitute for gunpowder without coming into permanent use. I shall be glad to learn from those who have had opportunities of judging of the relative merits of the explosives named at the head of this letter, whether Lithofracteur and Pudrolythe are as safe agents for blasting in mines as gunpowder in the hands of ordinary miners? Do the new explosives produce little smoke as compared with gunpowder, as this is an important element to deal with in the Cleveland ironstone mines—to get rid of the smoke? An explosive producing little smoke and as safe as gunpowder is what is required. There seems to be no doubt as to the great explosive force of the new compounds.—Dec. 11. C. V.

#### WORKING IRON FURNACES ON SUNDAYS.

SIR.—In connection with my former communication, in which I propounded the question—"Is there any practical method of working a large iron-smelting furnace by which work can be suspended upon the Sabbath?" I take the liberty of enclosing you a copy of a letter which I received from a gentleman connected with the Ashland Furnace, Kentucky, in which your readers may be interested:

"Ashland, Kentucky, Nov 14.—Yours of the 6th inst. is at hand, and contents noted. We stop our furnace, the Ashland, every Sunday. There are some 60 blast-furnaces in this, the Hanging Rock Iron region, using charcoal for fuel. Much more than one-half of these charcoal furnaces are stopped on Sunday. We think the Ashland the only furnace in the world using raw coal which is stopped on Sunday. We believe many furnaces might have been built so as to be stopped, but cannot say that all can be now constructed.—JOHN MEANS."

I also send you an extract from the *New York Iron Age* bearing upon the question:

"The Ashland Furnace, at Ashland, Kentucky, is stopped during the 12 hours of daylight on Sunday. Formerly work was suspended for the entire 24 hours, but the workmen prefer the shorter time, for the reason that it gives them daylight to stop and start in. When necessary the furnace is kept in blast during Sunday, but that does not often happen. In a private letter before us the superintendent, Mr. Douglas Putnam, says:—'This furnace has made stopping on Sunday the rule—running the exception—since its blow-in three years last August, excepting a few months during the summer of 1870, when the hearth was very thin or worn. I am of opinion that a stoppage of 12 hours, or during daylight, is not only of no detriment, but is rather an advantage, giving an opportunity of examining all machinery, and with the men rested for the next week's work. We simply stop, make no change in burden, or anything else. The average production of the furnace per day is 40 tons; size 15 by 62. Stock yields about 50 to 55 per cent. During the time we did not stop the furnace worked no better, used no less stock, and averaged no more iron than when we stopped as usual.'"

While much may be said on the negative side, I think, Mr. Editor, that more can be said on the affirmative side than any of us anticipated. I hope, before very long, to obtain important and interesting information bearing upon the question, which it will give me pleasure to communicate to you. In the meanwhile, if you should obtain information upon the subject, I hope you will acquaint me with it.

JOHN C. HENDERSON, Jun.

Broome-street, New York, Nov. 26.

#### TREATMENT OF COPPER PRECIPITATE.

SIR.—Although many suggestions have been made to utilise poor copper ores in Cornwall, I believe the precipitate obtained has usually been so contaminated with other metals that the merchantable value is much reduced. To overcome this difficulty an invention has been patented by Mr. J. H. Dennis, of Liverpool, which will be of interest to a large number of shareholders in Cornish mines.

I may explain, then, that the object of Mr. Dennis's invention is to purify commercial copper precipitate obtained by the wet way, and also to utilise some of the metallic impurities extracted therefrom. The precipitate is first washed with hot water, to remove soluble salts. If it be desired to wash out sulphate of lead common salt is added, or the washing are used over and over, until they contain sufficient salt. The precipitate is washed with sulphuric or hydrochloric acid until the solution of sulphate or chloride is of sufficient strength to crystallise. Any copper which may have been dissolved is precipitated. After the treatment described in this and the above first head, the precipitate is sufficiently purified to be at once smelted into metallic copper. Thirdly, should there be sufficient silver to pay for extraction, he oxydises the precipitate after the second operation in a furnace, and afterward dissolves out the silver by hot strong brine or hypo-sulphite of soda, the silver being precipitated by copper, and the copper finally by iron. To produce sulphate of copper he dissolves the oxygen obtained under the above third head in sulphuric acid. The silver and gold, or either silver or gold, remain undissolved.

Now, I am quite ready to admit that there are comparatively few companies (considering the number of failures that are on record with regard to poor copper processes) who would be inclined to undertake the risk of erecting the necessary works, but Mr. Dennis would have no difficulty in finding many who would permit him to put up works and work their poor ores, giving him an agreement to take them at a fixed price upon proof of their capability to yield 5 per cent. net profit for six consecutive months, he taking half the profits earned during the probationary period.

M. N. E.

Liverpool, Dec. 7.

#### RAILWAYS FOR NORTH CORNWALL.

SIR.—Considerable interest has recently been aroused in the minds of the inhabitants of North Cornwall from the fact that the neighbourhood has been the scene of an uncommonly large number of surveyors taking surveys of intended lines of railway. It would appear as if all of a sudden the eyes of those interested in railway traffic in Cornwall and Devon, and also in lines drawing support from these counties, were beginning to open to see the enormous capabilities of the neighbourhood and their consequent requirements, while it would be too much to expect that all the intended schemes would obtain the needful Government sanction, yet it is to be hoped many will. West Devon and North Cornwall have really and truly been neglected as regards railway communication. No doubt one of the leading causes has been the want of capital. But this may not be all. The curse of unreasonable opposition, directly or indirectly, however, has, it is to be feared, done its work too well. May former shortsightedness be set aside, and the commercial telescope be adjusted at the right focus respecting these deserving districts.

The tract of country between Barnstaple and Wadebridge embraces large areas of agricultural and mineral districts, the former very extensive indeed; the latter also extensive, to say nothing of the mineral ground between Wadebridge and Truro. The capabilities of these districts in an agricultural point of view to afford railway traffic are difficult to estimate, but they may safely be put down as great. Relative to the probable supply of traffic from minerals the most sanguine can only guess what a line of railway would open up. That minerals abound over a large portion of the ground is quite clear. The four leading metals of the two western counties—copper, tin, lead, and iron—are known to abound within the bounds of the district. It is equally a fact that large quantities of those minerals must remain unearthened unless the neighbourhoods in which they abound are opened up by railway communication.

In addition to the metals the mineral slate abounds in immense quantities. Slate and slab rock exists very extensively. But the chief slate formation is in the neighbourhood of Camelford, where the beds cover a great many square miles. This district is best known commercially as the Delabole district, the slates produced from which have a world-wide fame, on account of their superior quality. The source of traffic to a line of railway passing through this neighbourhood from the transit of slate alone could not fail to be an important item. A very large portion of the slates and slabs produced, now obliged to be shipped, would pass over a line of railway did such exist. Slates are carted a distance ranging up to 40 miles from the quarries, at an enormous cost for carriage, the commercial meaning of which is the minimum consumption of the article in such neighbourhoods. The rail, however, banishing distance, and reducing the cost of carriage to a fraction, would scatter those celebrated slabs tenfold, to the no small advantage of the railway companies, and at the same time produce such favourable effects in the slate quarries as to enhance their value very much, and bring them into far greater importance. The like fact is, of course, the more or less applicable to all property in the neighbourhood through which the line passes.

RESIDENT.

#### QUEENSLAND TIN.

SIR.—The following is an extract from a letter, received last week, from an intelligent tin miner as ever left St. Just for Australia. Writing from Ballarat, he says—"Bad news from Queensland and Port Darwin; it seems to me that the whole is collapsing altogether, and speculators are doing nothing but losing money." I think you will do right to insert the above in your next paper, as I feel confident the information is reliable.

TIN MINER.

Penzance, Dec. 5.

#### THE NEW GOLD DISTRICT—ISLAND OF ARUBA.

SIR.—Acquainted with every corner of this island, with its inhabitants, climate, resources, and mineral wealth, a few observations thereon may interest some of your readers. In old charts the name is engraved Oruba. In "La Lingua Papimento" the pronunciation of the English letter "v" is often assimilated to that of "b;" hence Uva is pronounced "Uba," and that of "O" in Oro being shortened, the modern name of Aruba has been substituted for "Oruva," the selection of which, so appropriate to gold fields, was probably made by the early Spaniards after their discoveries. So little was this island generally known that in August, 1839, the British Consul at Point Thomas, with the captain of a vessel of 250 tons, chartered to the island, had great difficulty in obtaining satisfactory evidence there that along the island there was safe anchorage for such a vessel. The currents, or stream, or "strom," as they are called, from E.N.E., under the influence of the trade winds, are very strong, and, therefore, except upon business, there is little inducement to the inhabitants or others to enjoy the beautiful sailing they would otherwise do, and there was little communication with the island.

The first native gold found in the island in modern years (1823) was by a shepherd boy, in stooping to drink in one of the river beds, and for which he obtained some exchange at a store as copper, when gradually the discovery was made, and the Government worked the alluvial gold fields, and very pure and heavy gold was found in the small dry river beds and in alluvial ground. In the first concession which was made of the mineral rights of the islands to the Netherlands, which took effect in 1854, were several obstacles to its adoption in this country, as, if a company was formed in England, a double board was required in the Netherlands, as well as official Netherlands representatives in the colonies; and a further condition was required, that not less than 50 natives should be constantly employed, under penalty of forfeiture of the concession. The Government were likewise entitled to a royalty of 2½ per cent.

In 1867, whilst proofs of the ores were being made in England, with arrangements for the necessary works in the island, a Senor Isola appeared on the ground, never having taken any part in the discoveries, or of the proofs made up to that period, but being enraptured with what he saw of the works of others, waved his wand, and in the euphonious parliamentary language of the celebrated Mr. D'Israeli, "whilst the boys were bathing he ran away with the clothes." In the new concession, granted in 1868, the terms were far more liberal, no royalty was required, nor was the company called on to keep employed at all times 50 natives (although now they will probably employ 1000); a yearly part of about 210f. English, 2500 f. Dutch, was the ground rent. This concession has been confirmed by the Government, and enlarged in favour of the enterprising Americans who acquired it by purchase from Senor Isola, and who have since formed the Aruba Island Gold Mining Company (Limited); but who, notwithstanding proofs made since their acquisition of the property entirely confirming the auriferous character of the country, are possibly not sensible of the real prize they possess. It may, perhaps, be added, though not generally known or remembered, that British subjects are not within the circle of most favoured nations (say Spain for one) to whom the royal and national rights of the Netherlands are accorded, and when such are especially desired John "must be a Dutchman" if he can. All nations will, however, be glad to hear of the good prospects of continuous large supplies of gold from this now additional acknowledged gold field.

#### A FORMER RESIDENT FOR SOME YEARS ON THE ISLAND.

In the letter on this subject, in the Supplement to last week's Journal, J. Hitchins was printed for J. Hitchins; it was Josiah, not Jehu, who brought out Devon Consols.]

#### AN AMERICAN'S VIEWS OF THE TIN MINES OF CORNWALL.

SIR.—The rejoinder of Mr. G. W. Baker to my remarks on his former letter to you is an ample acknowledgement of their truthfulness and impregnability of my position, yet, at the same time, is an ingenious though clumsy attempt to palliate a gross error. It is no uncommon thing for men to have recourse to personal abuse when they are driven into a corner, and cut off from all accessibility to facts in argument. If bullying were mining I should have no hesitation in at once acknowledging him my superior; but as it is not, and as I have met with similar treatment before from similar pretenders, I am rather amused than otherwise at the entertainment he has afforded me, in common with your numerous other readers. The present display is no doubt a striking portrait of the man himself—an embodiment of all that he is, and the conclusion of all that he knows of mining. He has evidently to learn that mining in Cornwall is conducted as a business, with a view to the best pecuniary results, prosecuted upon the merits and peculiarities of each individual concern, and is not decorated in fanciful attire, with the gilding made prominent, for ulterior and nefarious purposes.

If the Boscombe Downs Mine is in the condition that Mr. Baker says it is—machinery out of doors, shafts untimbered which should be timbered, and water dripping everywhere from the upper to the lower levels, irrespective of the damage it may do in a soft ground mine as that is reported to be, and the additional expense it may involve in raising the water from greater depths than needs be, together with the ill-condition of their dressing-floors and the demoralised state of their workpeople, as affirmed by Mr. Baker—then I have no hesitation in saying that no one has any right to assume that that mine is a fit representative of the tin mines of Cornwall; and, having said as much, will leave the avowal of such statements to those whom they more immediately concern.

As no facts contained in my letter in the Supplement to the Journal of Nov. 30 have been controverted, I have nothing to do but to dilate on the subject in a general way, and here I may remark that to call ill names in a controversy, or to have recourse, however qualified, to the application of uncomplimentary epithets, may be very fashionable in some quarters, and may there serve to strengthen one side of a disputed position; but it will not do so in this country. As to myself, I never plunge into a dust cloud, especially when I have reason to know that it was purposely raised to bewilder and mislead me; I rather prefer to move in my own normal sphere, beyond its reach, and that of the writer by whose instrumentality it was produced. It would savour of much weakness in me to condescend to a vindication of my knowledge of mining in this country. That is as well known to others as it is to myself; but I have lived in places

where one cannot be credited with what he knows, nor with what he is, and where the practice is common amongst a certain class to augment your own importance by studied disparagement of others, and where the measure of success attendant upon such practices is looked upon as the proper criterion of business abilities.

What a perversion of ideas and abuse of language is exhibited in Mr. Baker's performance! How ill applied is the Latin phrase, *coethes scribendi*, to one whose writing was instigated by self-defence. Cornish mining was assailed, and I am an endorser of its principles, and a Cornish man; and, therefore, my defence of Cornish mining was indirectly self-defence. When I first read "An American's Views of Cornish Tin Mining" I regarded them as being merely an escape of a turgid imagination, rendered licentious by over indulgence; but his rejoinder, in last week's Journal, to my strictures of the former week has entirely undeceived me, as by that it is clearly to be seen that he had an ulterior object. His own words are—"As to other improvements to replace the concatenation of fortuitous circumstances now employed in tin washing, some suggestions may be made at the proper time, and to the proper persons." In this paragraph we have the object; and, to prepare the way for its success, the present methods of tin dressing required to be disparaged—that is, to increase the apparent value of one thing another thing in juxtaposition to it must be depreciated. He has also stated, as an apology for the publication of his views of Cornish tin mining, that it was done with the concurrence and approval of some interested in Cornish mines, but in what their interests consist is not stated. It might be by revolutionising a system which would immediately require to be itself superseded by something else.

Mr. Baker does not attempt to controvert my figures as to the money value of a ton of stuff containing 20 lbs. of black tin at 80/- per ton, but evades the point with a flourish, that when he teaches arithmetic he hopes to have gentlemen for his pupils. This probably is a more characteristic remark than he intended it to be. I mean, of course, as to himself, as I am happy to know that no man can be esteemed a gentleman in this country who is not already instructed in the science of mathematics. My opponent accuses me of having written more in my last letter than I knew of mining, but that he has much more to say on the subject. I am very glad that he has, and would like to hear from him, by way of a beginning, what advantage can accrue to mining from the timbering of a shaft which is sufficiently firm without to be self-supporting? And, further, what are the peculiarities and fundamental principles of Cornish tin dressing—two branches of mining which he has specially instanced as faulty at the Boscombe Downs Mine? He also assumes to be very valiant because he can write what he thinks about the habits and customs of the English, and have it published in an English journal, a piece of bravado, by the way, which I esteem as being highly complimentary, not to himself, as he intended, but to the English press. It stimulates my pride to reflect that I am a citizen of a country whose institutions, including the press, are as free in their operation as they are alleged to be in theory. Would that he could say as much for the institutions of America. Perhaps, I cannot do better, as our friend seems to luxuriate in Latin quotations, than to conclude with one; it is both pertinent to the case and applicable to him: *Ab alio exspecte, alteri quod feceris.*

ROBERT KNAPP.

Liskeard, Dec. 10.

#### N. ENNOR'S REMARKS ON THE QUANTITY OF TIN ANNUALLY WASHING DOWN THE RED RIVER.

SIR.—With your permission, I will make a few remarks on Tin Mining and Tin Dressing. I have recently been on a tour of inspection of mines and stampas through Cornwall with a gentleman interested in mines, and like most other sight-seers and freethinkers we strolled over many of the most celebrated tin mines in the county, such as Dolcoath, Tincroft, Cook's Kitchen, North Pool, and many others; in fact, we visited most of the mines situated near the celebrated Red River valley. I may as well at once set it down as a valley glutted with tin. Having heard extraordinary tales respecting the loss of tin from the mines from all the people we met, we wended our way down for about ½ a mile through it, and I am bound to admit I was taken by surprise. I observed man's inventive genius had sorely tried in finding out the best means of working the mines, bringing the poor masses of tinstuff to the surface, and extracting the tin therefrom. These hitherto hidden treasures many men will argue have lain concealed there ever since Adam's creation; but from that view I differ, and I am convinced that all sound practical men of the present day will do the same, knowing as we do that six-sided quartz diamonds have grown long since Adam moulder'd in the dust, and on that diamond may be seen cubes of mundic and lead formed on its sides and angles. On some stones as many as six or eight substances may be seen formed on a first base. I cannot suppose that Cornwall now contains a single keen, practical miner who has not come to the conclusion that large portions of the tin and every other ore found in this prolific vale has been formed there long since the Ancient Britons held sway or the Druids had the pre-eminence over and on what are called and supposed to be their own sacred rocks, and which were visible to us on the sides and summits of the surrounding hills. I will not, however, carry this subject further, but leave it in the hands of all freethinkers, with liberty to form their own opinions as to the age of all ores, my opinion having been formed long since, and every day I am strengthened in the belief that there is not a single substance in all creation but is continually changing its position.

Returning, therefore, to the valley, allow me to bring before the notice of the mining interest and the public generally a subject of startling interest, obtained from the best authority I could procure. Grounded thus on well-authenticated evidence, I set them down as facts, which are stubborn things to war against. First, I notice the quantity of tin returned by the companies working tin mines in and about this valley is said at a rough estimate to be about 500 tons per annum. This portion is carried into the accounts of the mines to meet expenses and pay dividends. A great number of the mines, however, are only acting as so many lodestones—continually drawing money from well-intentioned shareholders' pockets in the shape of calls, but all men know that legitimate mining in prolific rocks is a paying thing if managed by practical, thinking, and smart agents. But to make them paying ones the agents must stick to their pay-day from except the ores of the mine. In my day I have seen many mines managed by men called good miners who were quiet and easy, and yet never returned a shilling to the company, whilst the same mine in other and smarter hands would have paid thousands. These quiet and easy men have most of them the knack of writing coaxing reports which draw from the shareholders' pockets what ought to have been used to purchase bread for their children for years after the mine should have been abandoned.

Next, I turn to the rich Red River and analyze it. Into this the refuse of many tin mines falls, and tin associates with iron oxides, causing it to be called the "Red River," having exterminated all fish and almost every other living thing in it. Having long heard that tin was washing down to the sea, in our stroll down the valley I questioned many of those we saw working on the spot respecting it. Their answers almost stunned me. One of them told me that 70,000/- worth of tin was annually caught by men who got hold of little slips and corners by the water side, and one lord received over 4000/- a year as dues for only portion of the stream. I met one keen-eyed practical man, whom I questioned pretty closely, and I drew out from him that he left a situation he had in a large tin mine above and took a corner by the Red River side in preference to being a well paid tin-dresser; he was, however, wide awake, saying they were only fools who informed me, and that he would sell his tin for half what they said he got out. I found on enquiry respecting him that when he commenced catching tin in the valley he stuck to it like a leech, up in time in the morning, jumping into any passing donkey-cart to get there more quickly, but the fruits of the river soon produced him a pony and trap, and now he has a horse, trap, and silver-mounted harness. This is an item in confirmation of the report of the riches which go down the river. I had read to me a portion of the copy of a dues collector's book, showing that 50,000/- worth of tin is yearly caught and prevented from going down this Red River, and from the best authenticated accounts I

get I could come to no other conclusion than that 50,000*l.* worth of tin really is annually caught by these men, recently termed "squatters." The sea beach, too, is said to be now worth 1*l.* per ton. Therefore the nearest calculation I can arrive at is that there is at least 60,000*l.* worth of tin annually sent down this river, which vast sum is lost even to the dividend-paying mineowners; this must fall very heavily on those who are continually paying calls, and is most painful to contemplate.

Now comes the grand question—Are the best means used at the mines to catch or detain a larger portion of the tin? To me it is clear it is not properly handled. I know tin will go down the stream, but it should not go to this extent. Then, what is to be done to catch it? Many persons informed me that there is not a work on the river but one or more of the mine agents above, or their friends, are sharing with the "squatters;" but this I do not credit. Still there is a mystery about 60,000*l.* a-year going down the river; and certainly if any agent could be proved to be feeding on the "squatters" returns the shareholders should weed them out. These men on the stream are men of genius, and useful men, and are doing nothing wrong in catching the tin; but they should be at or near the mine, retaining the tin at the mines is not properly handled if so much goes down the stream. In my day I have had the dressing of nearly every sort of ore, and long ago I discovered that tin is a ticklish thing to deal with; but these are points that I call every agent's attention to, and ask them to point out what is to be done to catch this loss of tin to the mine proprietors? I might even say waste of tin, seeing that parties tell me the seabeach is worth 1*l.* per ton; but they do not tell us what portion is gone to sea, or if Nature requires it there to tin the fish; if so, it would not be wise to war with Nature's laws.

Still, there is a question that forcibly arises, and one somewhat mysterious, on this very point. It is said that 6 lbs. of tin per ton will pay at the mine for raising, stamping, and returning, and leave a profit to the proprietors—in fact, I know of mines doing it. This being so, I set down 6 lbs. of tin to be worth 6*s.*, out of which dues and every expense has to be paid for raising, stamping, washing, and purifying, and the sea beach, if worth 1*l.* per ton, should have 20 lbs. of tin to the ton. Then, why work tin miners only worth 6*s.* per ton? This may be a puzzler to every book-taught professor, but it is one which many a practical man may unravel, and I call upon practical tin miners and dressers to do their best to do so, for it is a subject of importance. I once remember a would-be scientific man being with me and the late Mr. T. R. Avery, who was very fond of questioning all his workpeople as he met them. The would-be learned man asked him why he wasted time with such men? Mr. Avery laughing replied that it was his hobby, as he never exchanged one hundred words with one of them without being able to turn one to profitable account. I will continue this subject in a series of letters, and I hope they will be read by every tin miner, and that some of them will give open and candid replies to them, with their names attached, or I must pass them unnoticed. I have here named only the Red River, but these remarks apply to the refuse of every tin mine in the two counties, unless it is proved that the red oxide of iron has a greater tendency to carry off tin than other substances.

N. ENNOR.

#### UNCERTAINTY IN MINING—No. I.

SIR.—Our age is an age of unprecedented and singular activities. Celerity of movement and quickness of thought are pressed into requisition in every phase of our life. We seem impelled by irrepressible influences and desires. From proverbial slowness and stolidity we have gone to the antithesis of over haste. Human impulsion is stretched to its extreme tension. Our wills are inoperative before the waves of progress and retardation which either advance us to the acme of prosperity or hurry us to the goal of adversity. Coincident with the application of steam to the purposes of locomotion and propulsion, and electricity to the communication of intelligence, our conceptions have been quickened and intensified. We now rush where once we feared to tread. We appear parsimonious of time, but prodigal in effort. We compress into a few years the work of a long life. This tendency to supra exertion is not limited to our intellectual and political advancement, but manifests itself in our commercial and speculative pursuits, and is too often accompanied by evil results. We have softened brains, premature decay, and shortened lives. We are constantly brought into circumstances which imperil our fiscal status, and drive us to the verge of almost national bankruptcy. We have our alternating periods of unexampled prosperity and stagnation, and depressing pecuniary difficulties.

But it is remarkable that in the midst of this wonderful intellectual development and scientific research we have no truly scientific basis for mining operations, and this is the more unaccountable, seeing that science is so extensively and successfully applied to the various branches of our industry and manufacture. Science is the true coadjutor and minister of human progress; no domain of nature is exempted from its keen and eager scrutiny. The remote planet and the most familiar substances are alike subjected to analysis. With singular prescience, "She stretches forth her hand and charms the latest secret from the moon." By its aid we are gradually acquiring supremacy over the destructive elements of nature, and no department of our social life remains unaffected by its power. We have made the lightning the swift messenger of thought, and have reduced the power of steam to the docility of childhood; we have made the beam of light our portrait painter and the sun the recorder of his daily history; the pathless sea has become the familiar highway of all nations, and our commercial intercourse with diverse peoples has been accelerated and enlarged; we have enriched our pharmacopoeia by the knowledge of plants, and have transmuted dead and inert matter into living force and useful commodities, and in other manifold ways we are constantly deriving wealth and strength. Our civilisation would be incomplete and impossible without the auxiliary assistance of science. It has been well said "The thoughts of men are widening as the progress of the sun." We are witnesses to the slow evolution of great governing and regulating principles from the most apparently contradictory facts, and, doubtless, as our culture increases the correlation of all force will become more and more manifest.

But we have not sufficiently utilised our increased knowledge in Mining. It is true we have perfected our machinery, and improved our mode of dressing and preparing mining products. We have added to our facilities for sinking and hauling by a more extensive application of mechanical power, but still one without any reliable information to direct our explorations, we grope on in comparative obscurity, and, at best, resemble human truffle hunters. Our actions are more instinctive than inductive, and we are too contented with the rude and appealing empiric that "where 'tis there 'tis." We have scarcely superseded the use of the dowsing-rod. Is there a necessary connection between mining and uncertainty? We presume that some law determines the deposition of metallic minerals, that chance and caprice do not operate more powerfully in the production of lodes than in the formation of matter generally; and it is obvious that the abundance of facts, and the accumulated experience we possess, would considerably hasten our enlightenment, and decrease our ignorance, if they were systematically arranged, and prepared with the view of solving the many difficult questions which appear inseparably associated with the deposition of metallic veins. Theory and practice have too long been antagonistic to each other: we have not endeavoured to effect a combination which would materially assist us in the explanation of many obscure phenomena.

The miner looks with distrust upon the assertions of the mere theorist, and rightly so, for in many cases those theorists have arrogated to themselves knowledge which they have never acquired, and have predicted results which have been proved to be totally at variance with well ascertained facts. Unfortunately, these would-be geologists have seriously impeded the advance of scientific mining, but the miner should not be deterred by such impediments; and he should also remember that whatever objections he raises to theorising, he is constantly compelled to exercise the same faculty as applied to the relative distances of the planets in his daily avocation to meet the difficulties which beset his pursuit; and we would remind him, also, that what is now proved to have a real existence in fact, was once

only a shrewd guess, or at least an opinion founded upon inference. Take for example "Bode's Law of Arithmetical Progression," and the doctrine of "Phyllotaxis in Botany." We have verified by actual discovery the correctness of the former theory, and have learnt by the latter that leaves are not promiscuously placed upon trees, but that they are disposed in such a manner as to be in accordance with geometrical order and arithmetical exactness. In those cases the theory anticipated the fact, and to its promulgation may be attributed the discovery.

It is quite possible that in mining a similar result would follow if we would discard prejudice, and investigate the doctrine which seems so opposed to our preconceived opinions. We know full well that the mine agent has comparatively little time to devote to such investigation, and we assume that we are imputing no blame to him when we assert that in too many instances his previous education unfit him for the task, even if he were so disposed. Considering the great disadvantages under which he labours, he cannot be praised too highly for the skill and ability he exhibits. But we submit we have sufficient evidence of a rudimentary character to form a basis for induction. We know that copper and lead lodes have each their respective bearings and dip—that cross-courses cause displacements to the right or left of the true course. We know that certain rocks are congenial for the production of mineral, and that the contiguity of the vein to such strata enhances the chances of productivity. We know that in certain localities when similar indications obtain that the same lode is found productive and poor, the distance of a few fathoms apparently determining the opposite conditions. We know that a change in the constitution of granite—its decomposition—affects the value of the lode. Tin is usually associated with chloride and granite, but quite recently we have discovered it in combination with arsenical pyrites at New Great Consols. We know that copper is almost exclusively found in clay-slate, but we have a remarkable exception to this, for according to De la Beche, the rich deposit of ore at Wheal Friendship is in the carbonaceous strata. What freak of nature is it that limits the existence of tin to the counties of Devon and Cornwall? and how is it that manganese is only associated with trappean rocks and dunstone? These are only a few of the facts and questions which continually present themselves to the mind of the intelligent and thoughtful miner for solution.

It would be tedious and unnecessary to recapitulate all the indications which induce men to explore, and which guide them in the formation of opinion and the estimation of mining property, but sufficient has been adduced to show that they do not warrant us in assuming that they are a mere fortuitous concourse of circumstances. Law is as much concerned in the production of these dissimilar effects as it is in the production of the determinate crystalline forms which enables us to classify our minerals. All the kingdoms of Nature are under the dominion of law and order. It would be unwise to suppose that the mineral deposits which exist in our midst are the result of caprice and chance. It would be equally unwise to suppose that it is impossible to form a basis for induction because we have already evidence to the contrary. The exploration of our coal fields, the sinking of Artesian wells, and the predicated existence of gold are purely matters of geological induction. Very few have been the attempts to reduce the disorder and uncertainty to order and certainty.

Mr. Hopkins, in his "Magnetism and Geology," has suggested an approximative cause. Mr. W. J. Henwood in a recent work has aimed at a similar result, but the great field of unexplored facts is still open for the exercise of ingenuity, observation, and thought. Our theories are unsatisfactory, and only approach the character of incipient explorations, our ideas are still in a state of chaotic confusion. If the miners who style themselves mining engineers, and who we suppose possess the requisite information to entitle them to the appellation, were to devote their attention to the elucidation of these difficult questions, they would be employing their time and talents more usefully than in the production of reports which too often lead speculators to invest their capital in adventurers which terminate in disappointment and loss, and we would indicate to Mr. Barnard, our latest and great authority on mineral deposits, that if he were to employ his thought in the same direction it would do more to avoid the impending bloodshed and ruin of London than his great discovery of silver.

H. E.

#### REVIEW OF MINING FOR THE YEAR 1872—No. II.

SIR.—After the fearful panic and protracted collapse of 1825-6, and up to the year 1830, mining enterprise in Cornwall was all but dormant; nay, many of the great undertakings were abandoned, and the spirit of adventure had subsided into reckless indifference, not only in respect to the present but apparently in regard to the future. It is true that at that period we had the wonderful mines of Gwenmap, Camborne, St. Ives, and St. Just to inspire confidence, but it took all the wealth of the Consolidated Mines, St. Ives Consols, Levant, Great Wheal Vor, Dolcoath, Cook's Kitchen, North and South Roskear, Old Tolgas, Harmony and Montague, the Crinnis, Tresavean, Penstruthal, with others of minor note in Cornwall, together with the marvellous riches of Wheal Friendship, in Devonshire, to awaken and rekindle the latent spark of action, and thus sustain the hopes of capitalists in the future successes of mining. At this period the mining interests of Cornwall suffered severely; the Great Wheal Alfred, under the management of Messrs. Taylor was wound up—labour became scarce, workmen, as a rule, not half employed, and wages declined to the minimum point. Miners were paid only from 30*s.* to 35*s.*, and up to 40*s.*, or (say) 1*l.* to 24*s.* a-year, working 48 up to 60 hours per week, captains 4*l.* to 5*l.*, while in exceptional cases only did managers receive above 7 to 8 guineas per month, devoting their whole time and services to the use of their employers.

Two years later, 1832, the Reform Bill was passed, and the two general elections in that year infused enterprise and the spirit of adventure once more into Cornish mining, and great was the activity which prevailed for the ensuing 10 years, and up to the mania, for the construction of railways that culminated in the panic of 1847. During this period were discovered South and West Caradon, East Crofty, Botallack, Providence, Margaret, Trethellan, Treviskey, Brewer, Carn Brea, Tincroft, Seton, North Pool, East Pool, Devon Great Consols, Trelawny, Mary Ann, Par Consols, Fowey Consols, Wheal Basset, and various other successful mines, that at present are either merged into and amalgamated with the concessions of other companies, or otherwise "spun their yarns," and cease to exist as profitable adventures. At no period did mines pay so well as for the 10 years 1835 to 1845. We had then Tresavean paying 100*l.* per share two-monthly, with an occasional bonus, 32*s.* paid, or (say) 20*l.* a year for each 1*l.* sterling subscribed. East Rose, 60*s.* to 80*s.* two-monthly and others. For example, at Levant, South Caradon, North Roskear, St. Ives Consols, Fowey Consols, Devon Great Consols, Par Consols, Basset, Carn Brea, and Botallack were ten of the most brilliant prizes of the period to which we refer; and subjoined are the statistics of the properties in question up to the current date:

	Outlay.	Dividends.
Levant	£ 400	£ 175,160
South Caradon	640	356,584
North Roskear	1,400	104,499
St. Ives Consols	7,520	446,510
Fowey Consols	19,760	206,000
Devon Great Consols	1,024	1,192,960
Par Consols	7,200	229,960
Basset	2,624	326,912
Carn Brea	15,000	277,000
Botallack	15,200	123,960
Total	£73,768	£3,428,026

The gross expenditure of capital on these ten mines amounted to 73,768*l.*, and the dividends reach the large sum of 3,428,026*l.*, being 46*l.* 10*s.* on every pound sterling invested. Par Consols and Fowey Consols have ceased to exist as mines of importance, but Levant, St. Ives Consols, and North Roskear appear likely to revive, while the other five still rank among our choicest dividend concerns, and command a market value of 400,000*l.*, being 560 per cent. on the capital embarked, in addition to dividends.

The aspect of the labour market in the Far West is widely different at the present moment from the position it assumed in the years 1830 to 1845. During this period it ranged from 35*s.* to 40*s.*, and

very rarely beyond an average of 50*s.* up to 55*s.* per month; and now, owing to emigration, and the continuous drafts of skilled miners to Australia, America, Canada, the Brazils, California, and other foreign countries, added to the success attending the development of our tin-producing districts, the demand being increased for labour in home enterprises, and the supply greatly diminished as well as deteriorated in value, while the hours of employment are fewer, and consequently the amount of work effected lessened in volume and worth to the owners of mines; the average wages at this time is not far short of 4*l.* 10*s.* per month of four weeks, of 40 to 42 hours occupation. It will, therefore, be well for the workmen to remember that capital has its claims as well as labour, while society has its claims as well. It is true that many companies are paying exceeding well, but then materials, machinery, and merchandise are 30 to 40 per cent. in advance of the prices ruling 20 years ago. Hence the proprietors of mines have to encounter extra charges on every point, and but for the greatly enhanced price of tin, and the quotations ruling for lead and blonde, it is a question whether the great producing districts of Camborne, Illogan, Redruth, St. Austell, St. Agnes, Uny Lelant, and St. Just would now be so remunerative as were the mines over the period 1830 to 1835, when the average remuneration to workmen was barely one moiety of that now prevailing. The men have, however, claims on their side, as well as capitalists who work the Cornish mines, and but for the restricted hours of employment we should have more sympathy with the labourers than we have, especially regarding the high prices of provisions, and the enhanced cost of the necessities—say naught of the luxuries—of life.

Returning, however, to the year 1830, Dolcoath, Cook's Kitchen, North and South Roskear, East Crofty, Stray Park, Wheal Frances, and Camborne Vean were the only mines at work on the north side of the Carn Brea hill, with Bassett on the south side, comprising the two parishes of Camborne and Illogan. Tincroft and Carn Brea, now two of the best and most profitable tin mines in Cornwall, were at that period suspended, and the workings filled with water. It is true that we had the Old Tolgs, Harmony and Montague, and Old Buller in Redruth, with the brilliant success of Tresavean and the Gwennap Mines to encourage the late Capt. Teague to re-work the former and Joseph Lyle the latter, and wonderful have been the results of their achievements. Penstruthal, too, at this period was in its zenith, having realised 80,000*l.* of copper ores in one year, but at this period neither South Frances, East, West, and North Bassett were known, nor were the riches of East Crofty, East Pool, or North Pool even discovered, far less developed. The first-named gentleman had met with distinguished success at Tresavean, which at one time, as already stated, divided 600*l.* upon each 32*l.* 10*s.* share yearly—that he not only started Tincroft, but likewise Trumpet Consols, still paying 800*l.* dividends yearly, and likewise several other important and valuable old abandoned mines until he became the most distinguished miner of the day. Capt. Lyle also started the Relidian, Duffield, and Wheal Kitty (St. Agnes), the last of which is one of our best existing tin properties, and adjoining which is the St. Agnes Consols, that bids fair to rival its rich neighbours; about the same period Lord de Dunstanville and the Messrs. Praeds started the East Crofty, that declared dividends of over 98,000*l.* upon an expenditure of about 11,000*l.* The success of this property led to the re-working of East Pool, North Pool, West Tolgs, and other valuable properties.

About the year 1840 Dolcoath and Cook's Kitchen showed unmistakable signs of exhaustion of copper ores, and their executives paid little or no attention to tin as a product for future operations with chances of gains; and even the late Capt. Charles Thomas, 10 years later, spoke of tin in a qualified manner, and profits depending wholly upon the market price of that metal. In fact, the discovery of the immense deposit in Dolcoath, "so valuable in depth," was made by a party of tributaries, who drove a cross-cut at their own risks, upon an agreement to have a high tribute for six months, in case of success, as a reward for their time and enterprise. The results are manifest; they were richly and deservedly compensated, while the adventurers have secured a property worth 285,000*l.*, and dividends of 45,645*l.* a year. We allude to this circumstance as evidencing the value set on tin ores in this at present unparalleled district so recently as 20 to 23 years ago. This property is greatly enhanced in worth; consequent on an extension of ground westward, a portion of Stray Park being added to this company's grant. Adjoining this mine is situated the New Dolcoath, comprising the western part of Stray Park, Camborne Vean, and Wheal Frances sets, and embodying a field for mining enterprise unsurpassed in the county of Cornwall. The company consists of 8000 shares of 3*l.* each, fully paid-up, and the returns are now just merging into gains, and, according to the judgment of practical authorities, these will materially and rapidly augment during the coming and succeeding years. The levels of Dolcoath are extended into this property, and for a long course of years the works can be prosecuted without the aid, and consequent outlay and expense, of pumping-power, which alone is equal to a dividend of 10 per cent. on the capital. There is not only promise in the prospective, but certain and substantial dividends near at hand, and we must again congratulate Capt. Vivian on having secured a prize in this instance, as we did last week in referring to South Condurrow and the St. Agnes Consols. It is also a point of immense value in favour of the secretary, Mr. Comyn, who so early in his career so fortunately and happily secures among his constituency a mine of such sterling promise and advancing wealth.

There are many peculiar and favourable characteristics associated with New Dolcoath. In the first place, the lodes in their upper sections were exceedingly rich in copper, as was the case with Dolcoath, Cook's Kitchen, Tincroft, and Carn Brea, all of which are now communicated with each other, and constitute the richest group of mines in the United Kingdom, commanding a market value of 825,000*l.*, and yielding for the current year no less a sum than 118,000*l.* in dividends. Returning, however, to New Dolcoath, the yield of copper ore was over 400,000*l.*, and the veins in several levels and in depth exhibit similar promise of large bodies of tin as is proved to exist in the several mines referred to. Still it is singular that, from one circumstance and another, until recently the workings have never been carried out with any degree of method, energy, or earnestness. Stamping machinery on an improved principle, cheap in first cost and comparatively inexpensive in maintenance, is being erected, and the dressing paraphernalia extended, which in in the early spring will be completed. In this property there is ample scope for legitimate gains, and the public will do well to turn their early attention to the purchase of shares, selling in the aggregate for less than half a year's dividend of either of its neighbours, Dolcoath and the adjacent mine of Tincroft,

East Pool, discovered by the late Capt. Nicholas Tredinnick, about the year 1835, rose rapidly in market value from 5*l.* per 12*s.* share up to 52*l.* (say, 67,200*l.*), with 640*l.* called up. The dividends over the 37 years amount in the aggregate to 84,400*l.*, averaging 228*l.* annually, or 3*l.* 7*s.* 6*d.* per cent. over the period. The dividends are now 2*s.* 6*d.* quarterly, and the market price 13*l.* per 640*l.* share, equal to 86,400*l.*, hence the mine is selling at 27 years' purchase. This mine is high enough, one would think, to deter investors, yet the shares are rather favoured both in Cornwall and upon the London market.

Tresavean and Penstruthal about the years 1830 to 1840 were exceedingly rich for copper, the former declared in the aggregate dividends, over 450,000*l.*, or about 3200*l.* outlay—yet the works were abandoned rather than subscribe the necessary funds to lay open the workings in depth, though practical authorities assert the chances of discovering tin below the copper deposits are equal to those which existed under very similar circumstances at Dolcoath and adjacent mines which skirt the northern side of the Carn Brea Hill. To the west of this mine is the Penstruthal Consols, that formerly was most productive of copper, and though worked only to half the depth of Tresavean, became abandoned after a short and brilliant career of success. This old mine, which is comparatively unwrought excepting on one lode "from which 80,000*l.* was returned in the year," is again set to work, and promises to become a great and important property, in the first mining district of Cornwall. This mine cannot fail to make large returns of both copper and tin, while the explorations on the "one" copper lode will afford numerous rapid and economical points for cross-cutting the parallel lodes so rarely

afforded in mining enterprise, yet so valuable in respect to time and money in developing deep sections of mineralised veins, and which, in this district are ever embedded in hard channels of crystallised granite, ironstone, quartz and capels, all of which are associated with the richest and most valuable deposits of minerals found in the locality. It has ever been the opinion of practical authorities that there existed a second deposit of copper ore in depth, as it is rarely the exception to find it when the chimney of the first bunch is found so near the surface—in fact, the deposit already partially exhausted was first discovered in unearthing a "fox," the ores cropping up to the soil. It is found that tin exist in several lodes, and at various points in the different veins in paying quantities. As soon as the necessary pumping and stamping machinery is erected the development must prove rapid—not by "steps," but "strides"—as in two to three years from this date the first section of 150 fms. in depth of the various lodes ought to be laid open, and the returns equal the greatest mines in Cornwall. The capital is more than ample—100,000.—management sound and practical, and the local executive earnest in its endeavours to forward the workings; hence there is, in the opinion of miners, a rich harvest for those who stick to the ship while the operations are being carried out.

*London, Dec. 10.*

R. TREDINICK,  
Consulting Mining Engineer.

#### THE STANNARIES COURT.

SIR.—It would be very satisfactory to learn from the Registrar of the Stannaries Court, or from the Vice-Warden himself, what becomes of the money obtained from unfortunate shareholders in mines wound-up years ago, and upon which no claims of any kind now remain unpaid? The public have a right to know this. At the present moment shareholders in mines which were wound-up by the Stannaries seven or eight years ago are receiving letters from solicitors to the Court, threatening proceedings for the recovery of sums which were then given as bad, or as unobtainable. These legal gentlemen will not even let the dead rest.

It would be well to know also, and, perhaps, some professional reader of the Journal will answer the question—Can a merchant through the Stannaries Court sue for goods delivered more than six years ago? Or say, more than six years before he applies to the Court? If we cannot get the information required from the official, will not some Member of Parliament move the appointment of a committee to enquire into the whole machinery of the Stannaries, with a view to its abolition? Here is a vocation for an able Member *in esse or in posse.*

PHILO-ARGUS.

#### THE STANNARIES COURT.

SIR.—I have been a heavy sufferer through the iniquitous proceedings of this irresponsible and wretched relic of a barbarous age, and I feel most grateful to "Argus" and "The Man of Kent" for drawing the attention of the public to an abuse which should no longer be tolerated. If every adventurer who has suffered would only come forward and state their wrongs, I feel confident that this miserable counterfeit of the Court of Chancery would quickly be swept away. Liberal M.P.'s have lately been talking a great deal of nonsense about this and that "Upas tree," which needs to be cut down; but here is a paltry thing, with a noble lord for its Warden, which, to my thinking, is ten times more abominable than any of the abuses which lends eloquence to post-prandial speeches. I would respectfully recommend the hon. member for Rochdale to leave "Woman Suffrage" alone for the present, as it can wait, and turn his attention to the Stannaries Court, which if he can abolish, or even reform, will, I am convinced, gain for him as great renown as fell to the share of his friend, Mr. Cobden, for his services with respect to the Corn Laws.

I do not take so gloomy a view of the independence of the Cornish members of Parliament as "The Man of Kent," though there may be one or two who lack the courage to express their detestation, in common with every honest man, of the doings of the Stannaries Court. Mr. Eastwick, the member for Falmouth, has already distinguished himself on missions with respect to the repudiation of certain South American loans, and is in every way an independent and conscientious gentleman. No one can doubt the independence and courage of the hon. member for Liskeard, the Right-hon. E. Horsham, for was he not one of the principal founders of the "Cave?" Col. Hogg, the Chairman of the Board of Works, sits for Truro, where sits this Court; but until cause was shown I should decline to believe that this fact would influence him.

Briefly, then, we would recommend that we not only secure a motion for a parliamentary return being made of the moneys deposited with this Court, but that we endeavour to obtain a reformation, if not the extinction, of this licensed abuse. As I have said before, if everyone who has been pillaged will come forward the thing is easy. We have heard a great deal of smart things being done with several of our mines in America, and great indignation has been aroused; but at home, a day's journey from town, we have a Court, originally intended to protect the mining interest, where "windings-up" last a lifetime, costs exceed the stakes at issue, and cheques are given for 5d.

CORNHILL.

#### THE PROGRESSIVE MINES.

SIR.—I was somewhat interested by a letter from "Observer," in the Supplement to last week's Journal, as it touches on a subject I have considered a good deal of late—the vindication of the character of bona fide "progressive" mines, which have suffered much within the last few months from the public blindly confounding them with many worthless schemes which have been palmed off upon them. I am an amateur miner myself, and am desirous of investing my surplus cash in such mines as "Observer" points out—that is, if they are as he states. It would be well for me, and others like me (who I have no doubt are very numerous), if we could be assured of the genuineness of a few concerns on the progressive list, our funds being too limited to go into the full-fledged birds, like Tincroft, Dolcoath, and others, to any great extent, and I, therefore, do hope the subject will be taken up by men more versed in the matter than myself, and that the mines mentioned by "Observer" will be more fully described by some mining authority who will, if he thinks fit, discard some of them and substitute others to his mind more promising. I notice he gives New Rosewarne the pre-eminence; will he tell me the cause of the shares being so low? I hear many speak well of them, yet still the market value goes lower and lower the nearer they approach their entrance into the Dividend List. There must be some secret to this.

Taking Polrose, the mine he mentions as second to the above; it is certainly situated in a wonderfully good district, and the prospects appear to be unusually good for so young a concern; but I scarcely think he makes out a clear case for such very strong approbation. Perhaps he has some further information behind which he will not mind making public. Again, with Boswrey, this is the only mine he ventures to predict the probable sum required to put it on a profitable footing. Why will he not, with his apparent local knowledge, give us the advantage of his predictions with regard to the others? I trust these few remarks will lead the initiated to render further information.

*Bishopsgate-street, London, Dec. 12.*

#### ENGLISH AND AMERICAN FINANCING.

"All honourable men."—SHAKESPEARE.

SIR.—We talk of American finance swindlers, like Jay Gould and Co., but we had better be silent and look at home. For instance, let us look at the gold and silver mine companies got up by English financiers during the past 18 months or so. If the mines were as rich in metal as they are in rascality they would indeed pay well! It is sickening subject. The half-false statements to which "honourable men" have given the sanction of their names—the downright falsehoods put forth to gull the unwary—cannot be exceeded in Wall-street or anywhere else. The "groove" in which the system runs seems to be to get hold of a mine or a claim, to puff it off by an eloquent prospectus, to get a board well sprinkled by members of the Stock or Mining Exchange, and if "honourable men" all the better—to cause such members to recommend it to all their clients, to push it to a premium, to send a discreet manager, who understands how to cook and serve up a report, and who is to remain there for a year—to sell quietly as his grand jucundus reports come in, and raise the public appetite, so that when the year is at an end and the manager returns to face "anxious enquirers," the orange shall have been well sucked, and nothing left for the gulls but pipes and peel, over which they can fight as long as they please. The sight is humbling enough for anyone who values character, and yet they are all "honourable men." Yet, say they, "We hold our original allotments—have not sold a share." No doubt, you are too wise to do that. You keep your qualification as director—say, 50 or 20 shares—and your fees will make up for all loss there; but you take good care that A, or B, or C, who has taken shares by the hundred for you, gets quiet rid of all his, amid sly chuckling from you all. I only wonder that those who do these things can show their faces among honest men; but yet they are all "honourable!" Take a few cases at random:—

Ecipes, 100,000.; all gone; winding-up.  
Eberhardt and Aurora, run up to 40.; now 6.; capital 250,000.

South Aurora, 300,000.; run up to 10.; now 2.

Camp Floyd, run up to 16.; now at 5.; *cum multis aliis.*

All having been sucked by "honourable" men are now thrown to the dogs. Shame! And yet such "satisfactory meetings" are held on the return of the agent. Oh! very. Capt. Shaw returns and "explains" about Camp Floyd, and the shares dwindle away more and more, on quiet realisations consequent on oozings out of the truth, which the wise ones had known long before. It was said that Camp Floyd was the mine of the year, would work all the year round—earth, air, and water being all in its favour. This is false, as already appears, as to the water, and worse is to come, as the shares still dwindle, and (as if to conceal the fall) are very rarely quoted—for, to attribute all to shares being forced in the market is now too old a dodge. If the things were good there would be plenty of buyers. Yet all persons concerned are "honourable" men. Oh! certainly. And I observe that Mr. Murphy has returned from America to "explain" about the Utah Company. The Lord preserve us from his explanations! Already the wind of them has reduced the shares 30 percent.; the shot itself will probably send them beyond the power of analysis.

These things make one blush for one's countrymen. Such a miserable exhibition

to make to foreign nations! At least let us make no more attacks on America at the Erie Ring, &c. We cannot afford it! Let us first "purge ourselves and live cleanly," as Shakespeare says. When will John Bull cease being John Bull? 'Tis true that the correlative of knave is fool: and 'tis true that fools generally beget fools; but still, that civilisation should seem to increase each class in a double ratio compared with the times of ignorance is almost enough to make a man wish for the dark ages again. Meanwhile, I ask you to allow me space for my "lament, which is a very natural expression to proceed from—

A VICTIM OF "HONOURABLE MEN."

#### THE BRAZILIAN MINING COMPANIES.

SIR.—The reported unexpected re-appearance of Mr. Henry Hayman on the scene after all the hard things recently said of him, both by the public and his colleagues, surprises many people.

The shareholders in the several companies will naturally look for some explanation; therefore, it may be just as well to mention two or three little matters upon which we shall require to be enlightened—

1.—Holding the post of Chairman of so many companies for working mines in South America, why did he betake himself to the West of America without letting his colleagues know his intention of so doing?

2.—What induced him to telegraph to his colleagues that he would return in a week or ten days when he proposed going to the Far West?

3.—Having been laid up, could he not have got some good Samaritan to advise his friends on this side of it, and thus assuage the just wrath of anxious shareholders?

4.—When Chairman of the several companies, why did he, having no more power than his fellow-directors, rule the entire management of the concerns?

5.—His intention with respect to the Eclipse calls? His sickness must not, of course, be questioned; but does it not strike one as extraordinary that, after such a long and unexpected absence, he did not inform his colleagues by telegram from the port of embarkation that he should really come home this time? Had he done so, would they not have postponed the meetings of the Don Pedro, Anglo-Brazilian, and Anglo-Argentine Companies until his arrival, in order that he might be present to afford explanations, and make an effort to retain his position on the boards, a position which he can now never hope to re-occupy?

Dec. 10. A WRATHFUL SHAREHOLDER IN ALL THE BRAZILIAN MINES.

#### THE UTAH MINE, AND ITS MANAGEMENT.

SIR.—You have kindly allowed me from time to time to make remarks in your valuable Journal respecting the Utah Mines. Professor Clayton's report is now before me, and by it I am glad to find that the remarks I made in the Journal at the time were, in fact, what has struck the Professor. Not to take up your valuable space too much, I would refer my fellow-shareholders to pages 5 and 6 of the Professor's report, in which he states, closing this part of it, "Buying ores from the adjoining property, of the same general type as that found in our own ground, is a little like carrying coals to Newcastle, to say the least of it." My remark at the time was that I could not understand "Why Mr. Murphy was purchasing carbonate of tin when, by his own account, he had plenty of them in our own mine." But I must confess that what did wonderfully surprise me was that with such an able man as Mr. Battersby on the board, such humbug should have been allowed for a moment. I am not a scientific miner, but I hope I have some little common sense, and therefore I prefer drawing the attention of my fellow-shareholders to what, to say the least, appears strange to me (as also to Professor Clayton) than entering into an argument with Mr. Murphy at the meeting, with the hope that some more able shareholder than myself will solve the mystery of this extraordinary proceeding.

I would also draw the attention of my fellow-shareholders to page 7 of Professor Clayton's report, especially where he states, "I am inclined to favour the plan of dressing the ores and selling them at Sandy Station," also to page 8 in his report, in which he states, "It will be well to prove that they can be handled with profit before going to the deep," and also to the paragraph of what we need. Now, I am under the impression that a good Welsh lead mining captain would suit our purpose infinitely better than the scientific Mr. Murphy, who costs us 3000/- a year, and whose management, in the words of the Professor, page 6, is "essentially a failure." In Mr. Murphy's own report, of Jan. 19, 1872, it is quite delightful to see how anxious he is, for the good of the Utah shareholders, to dismiss any worthy brother in the craft in mining who possibly might have been able to give him a hint or two that his management would be more satisfactory to himself than profitable to the Utah shareholders. I hope you will kindly find a space for this letter in your next, as I believe that many good mines have been rescued from failure by reviewing the management of them in the *Mining Journal*.

London, Dec. 11. A UTAH SHAREHOLDER.

#### THE PROGRESSING MINES OF CORNWALL.

SIR.—On looking through my letter in the Supplement to last week's Journal I observe I inadvertently described Polrose as being "west" of Great Work and "east" of Pollardas. I should have said east of Great Work and west of Pollardas. I also find that the North Rosewarne shares are about 4/10s., instead of 2/10s., the difference having been caused by an improvement, which promises to open out something very good. On the other hand, New Rosewarne shares are receding, and will offer a better opportunity than ever to investors, who are now able to go into it very cheaply.

OBSERVER.

#### A DRINKING WAGER, BY MINE AGENTS.

SIR.—Forty-five years ago mine agents and clerks were not so abstemious from the alcoholic stimulants as they have been since Mr. Teare and other temperance advocates came into this county, about the year 1857: nor, consequently, are the expenses at the account-houses so great as they were before that period. I knew a mine clerk who would drink 15 glasses of grog in an afternoon. He continued his drinking habit till the end of life. When he found himself near the verge of the grave he consulted a medical gentleman, who told him that if he did not give up the habit he must die. In reply, the clerk said, "If I give it up I shall die, so I may as well drink it!" And so he did, and soon died. He was one of four persons (two clerks and two agents) who made a wager, the clerks against the agents, as to which of the couples could drink the most wine, those who gave up first to pay all the expenses. In execution of the agreement they repaired to the inn at Comford. Two of the four selected sherry and the other two port wine. After drinking the contents of nearly two dozen bottles of wine the two agents (Capt. Rd. 8 and Capt. Rd. H.) gave up, being fairly beaten. They had to be placed, like dead pigs, on straw in the bottom of a cart, and so removed to their dwelling-houses. The two clerks, Mr. John P., and Capt. Henry T., were able to walk home, the former helping the latter. Mr. P. still survives to narrate the circumstances of this foolish bet. I am much pleased to say that drunken agents and clerks are not common now; I rarely see one. I knew all the above-named individuals. R. S.

Truro, Dec. 6.

#### SILVER MINING IN ENGLAND, AND THE QUEEN, KING, AND VIRTUOUS LADY MINES.

SIR.—Yes, alas! It is too true! these three mines are being wound-up, caused by the failure of the silver vein; but why such intense bitterness against me from your numerous correspondents? Permit me to ask them two simple questions—1. When would the next dividend of the two famous mines, Dolcoath and Tincoff, be paid if their stamps were, by some unforeseen accident, rendered useless, or the mines drowned, with no capital to repair the disasters?—2d. How many copies, Mr. Editor, of the very impartial and valuable *Mining Journal* would appear before the public next Saturday if on Friday evening you had to go to press without any type? Such in the past has been the position of the amalgamation process, and I can declare most emphatically that it has never yet been fairly tried. I still maintain that at the Virtuous Lady there are millions of ounces of silver, as some of the lodes are 50 ft. wide, and will average 8 oz. of silver per ton, 3 dwt. of gold, and 1 per cent. of copper. The world pronounces this valueless, but I say that it is wealth unbound, and the day will yet come when one and all will be of the same opinion, and feel astonished that other thoughts could ever have been entertained. Some 18 months since 1000/- worth of rich copper was returned from the mine, the get of a few weeks working, but the lode was bushy. Had the mine returned 50,000/- instead of 1000/- I should have been a clever, shrewd, intelligent, honest fellow; as it is, I am designated as a rogue and a fool, and am told that I deserve to die in a ditch. A hard fate, certainly; but, even in that sad predicament, it is more than likely that my thoughts would dwell upon the imbecility of mining men grasping at the shadow for the substance in zealously guarding and watching over mineralised matters that contain 20 lbs. of silver, and 1 per cent. of copper. The world pronounces this valueless, but I say that it is wealth unbound, and the day will yet come when one and all will be of the same opinion, and feel astonished that other thoughts could ever have been entertained. Some 18 months since 1000/- worth of rich copper was returned from the mine, the get of a few weeks working, but the lode was bushy. Had the mine returned 50,000/- instead of 1000/- I should have been a clever, shrewd, intelligent, honest fellow; as it is, I am designated as a rogue and a fool, and am told that I deserve to die in a ditch. A hard fate, certainly; but, even in that sad predicament, it is more than likely that my thoughts would dwell upon the imbecility of mining men grasping at the shadow for the substance in zealously guarding and watching over mineralised matters that contain 20 lbs. of silver, and 1 per cent. of copper. The world pronounces this valueless, but I say that it is wealth unbound, and the day will yet come when one and all will be of the same opinion, and feel astonished that other thoughts could ever have been entertained.

South-west from this mine comes the English company's mines, Sparrow Hawk, Last Chance, and Marion, on which are employed about 50 men, tunnelling, drifting, sinking shafts, inclines, &c. The Sparrow Hawk has recently struck another body of very rich ore. West of the English property is the Carrie Steele, which is actively worked by running open cuts and sinking shafts, and is yielding good quality and quantity of ore.

Next to this claim comes the Stafford Mine, which has a well-defined vein of ore 4 ft. thick, of which a recent assay gives the encouraging results of \$40 for the lowest grade and \$3000 for best.

A large force of miners is busily engaged in sinking on the lode and selecting the ore.

The improvements on this mine consist of open cuts and a tunnel some 60 ft. long, the vein stripped for over 50 ft., showing good milling quartz in them all.

Adjoining the Stafford, on the west, is the Lone Star, a very promising prospect, as yet but partially developed, but, from present indications, must eventually become a good mine.

These claims are owned by our jovial friend, Major J. D. Woolley, of Cheyenne, W.T., who has been largely interested during his short connection with mining in Utah.

We welcome and need all such men of capital and energy to develop the mineral wealth of this territory.

North of this is the Mormon Chief, and its extension, Grecian Bend and London, which consists of 3000 linear feet along the lode, 400 ft. in width. The developments, in tunnels, cuts, shafts, drifts, and inclines measure about 500 ft., showing a large body of milling ore.

This property has already obtained such wide reputation that it is needless to say anything further about it, except that it is soon to be offered on a European market.

It is owned by W. W. Lowe, of Omaha, and others.

Further up the hill we come to the Silver Circle and Wandering Boy, now being extensively worked by S. N. Pike and Co., of New York.

These two claims have gained an extensive reputation, owing to the native silver found in them, and the present workings consist of drifts and shafts done by contract.

North-west of these claims is the famous Star of the West, owned and worked by a New York company, of which Joseph Raw is president.

The mine is at present working 12 men, who are taking out a large quantity of ore of very good quality.

The vein is 40 ft. in width, and the ore taken out thus far assays from \$25 to \$3000 to the ton.

Good houses for the accommodation of the miners, and a blacksmith's shop are on the claim, consequently the company is well provided for.

A winter campaign. This mine is certainly very promising, and will soon pay good dividend to the shareholders.

Looking over to the south side of the town we have the Bismarck and Delaware Consolidation busily engaged in sinking down upon their vein by cuts, drifts, and tunnels, and turning out large bodies of good ore.

We next came to the Jenny Lind, celebrated as the only timber mine in Utah.

There are several tons of ore on the dump, but showing only a small percentage in metal.

Work will be vigorously prosecuted until something definite is found to prove whether it will pay to work it for cinabarin.

I must not omit to mention the Queen of the West, which is also one of our promising mines, and which, rumour says, has been sold to a Detroit party for a good sum.

I must now conclude my rather lengthy letter by appending a list of mines, some

of which have received and others applied for United States patents. Sparrow Hawk, Marion, Last Chance, Consolidated Camp Douglas, Silver Star, Silver Circle Consolidated, Wandering Boy, Star of the West, Silver Cloud, and Silver Cloud mill site, Red Eagle, Gentle Belle, and American Flag.  
—*Salt Lake Daily Herald*, Nov. 22.

## Royal School of Mines, Ternyn Street.

### MINERALOGY—LECTURE II.

#### SILICA, OR QUARTZ AND ITS VARIETIES.

I have to bring before you to-night a substance which we may call—if we assume a knowledge of chemistry—silica, but more commonly known as quartz, which term originated amongst the German miners. It occurs in crystals so marked and so distinct as to have induced the ancient observers and philosophers to give it the name crystal (from the Greek *crystallos*, ice), because they were wont from its appearance to confound it with ice, and considered it as water congealed so hard at one time as never to have been able to thaw again since. Let us now examine the figures in which this substance, when thoroughly well identifiable, is presented to us, as in this large crystal on the table. We find that quartz in its typical condition assumes a prismatic form, having six sides, or a double six-sided pyramid, the two frequently being combined, the pyramids terminating the extremities of the prism. If we require a clue to the recognition of a small fragment of this substance we have it in this, that when held in a proper position the plane of the prism will be seen to be always striated horizontally, and this character holds good whether we obtain the material from the Irish mines, from South America, or from Madagascar, whence the finest crystals are obtained. In the large museum at Paris is a fine crystal from Madagascar. They sometimes measure as much as 3 ft. in length, and from 1½ to 3 ft. in diameter, weighing in such a case no less than 600 lbs., and composed of nothing else than a mass of this pure material—in the certain and definite forms of which I have spoken. It is also met with in fissure veins which traverse the granitic rocks of the Alps, Scotland, and other places. In other cases this form may be detected embedded in certain porphyries, and in working these rocks the steel tools of the workman soon find it out by the resistance offered by the numerous crystals of this substance, scattered like many teeth through the mass. Want of attention to these minute embedded crystals may often lead us to be deceived as to the economy of working such rocks. Everybody acquainted with the hardness of flint which belongs to this class, and knows that it will strike fire with steel—i.e., it is harder than steel. If we attempt to cut or scratch the surface of one of these minerals with a steel tool the latter will get the worst of it, if applied in a certain way—by pressure—and way can only be made in the rock by taking advantage of its brittleness. This character of hardness will enable us to distinguish this class of minerals from a great number others which are more or less similar in other characters.

These quartz crystals are found (amongst other places) in the mines and streams of Brazil, not only whole, but in rolled masses, known as Brazilian pebbles, and are brought over to this country to be cut into lenses. On account of its hardness, its purity, and also its coolness, it is employed for making the best kinds of spectacles. If we examine carefully we shall find that we tread this same material—quartz—footstep in the streets of London; and we owe the smoothness and comparative comfort of our pavements to the fact that we have in a certain set of rock strata unassimilable grains of quartz, cemented together by other materials, and capable of being split into flags or slabs. Thus we have the hard variety of quartz found in granite, brought by natural agencies into a state of sand or powder, deposited a water, and again raised to the surface in such a form as to be easily handled by the workman. The hardness of this substance as pure quartz prevents it being used for building or ornamental purposes in the manner of the limestones of the last lecture. But in its character as sandstone it is largely applied to building purposes, and in some districts it admits of being split up sufficiently thin as to be suitable for roofing purposes, as is frequently the case in the North of England.

When we come to ornamental purposes we find that it is possible to work advantageously on some of these substances, and then their great hardness renders them capable of taking a much better polish than substances which are more easily worked. Their durability, too, is a most important character, and it has enabled thousands of the most beautiful works of art of ancient times to be preserved to our own day. That can be more striking in the British Museum and other collections than those elegant works devised and carried out by the ancient sculptors, reproduced on a scale quite on the exquisitely materials with a degree of perfection, both in design and execution, which cannot fail to raise to the highest point our admiration of the art of antiquity. I refer especially to the kind which are commonly called "engraved gems," the greater part of which were worked in materials of the class, when kings and officials could not, or did not, write their names, and so had them engraved with certain marks for impressing of seals; and when these came to be constantly worn about the person, and to be handed down from generation to generation, hardness was a most essential quality. Sometimes this quartz is and in less distinctly crystallised masses, and is known as "common quartz." Frequently occurs in mineral veins in almost all districts, but especially in the ancient mining districts, where a majority of the veins are in large part filled with this substance—e.g., in the tin district of Cornwall; it is also thus found associated with gold in California and Australia in one or other of its varieties. Here is a vein from Victoria, in which it is difficult to see a crystalline form; it is colourless and opaque, and scattered through it are numerous minute particles of gold, so minute indeed as almost to elude the naked eye, and which need some process of vibration to set them free. In the outer half you will see a large mass brought from California in the early days of the rage for gold mining. In veins of tin ore parts the quartz will predominate; in others the ore will be quite visible to the eye, but the proportion varies with every foot of the vein examined.

There is, again, a red brownish material, capable of assuming a very fine polish, which any attempt to cut with steel tools will show to possess a similar degree of fitness to common quartz. In its red, brownish, and greenish tints the name "asper" is applied to it, and it was known in early times on account of its durability and polish. In some instances we have a mass of quartz, containing some cavities and hollows of very definite form: in this case some are cubical, others rhombohedral, both forms in which we know quartz does not usually crystallise—unless never, the rhombohedron only in the case of minute crystals. This may be explained by supposing various crystals of different substances in these forms have formed on the walls of a vein, and after the rest of the vein had been filled with quartz these crystals to have been removed by natural agencies. Thus, as it were, a page from the history of the vein from the time of its first opening to its being filled up with these materials, changed as we now see them. Of the other numerous varieties of quartz I can only mention two or three special kinds. From Scotland we have some very notable ones, showing a beautiful yellow tint, and known as "false topaz," and also the "caeruleum," from the name of that name. On the other hand, we have crystals showing a smoky tint, coupled in many cases with a great amount of translucency and reflection of light; these are called "smoky-quartz," or "topaz." Another variety has a bright pink tint, from the presence of a minute quantity of a certain metallic oxide, and is known as "rose quartz." Another variety exhibits a magnificent purple tint, and is called "amethyst," which term has a very fanciful derivation—Greek, *anithmētē* (not to be inferior), from a belief of the ancients that a person wearing a ring of this material might indulge in deep potations without experiencing the consequences. In the substances known as "agate," which are so largely used in the present day as in the times of the Greeks and Romans, for personal adornment, crystals of transparent rock crystal, with sometimes purple and other varieties of the same substance will often be observed. It is notable that certain rock masses which have large hollows within them, of more or less regular shape, sometimes rounded, sometimes globular, appear to have received solutions of various substances in water, and thus to have had deposited within their interior some of these materials, arranged on the walls of the cavity so as to have their points towards the interior, or in other cases in layers. Sometimes, as in this specimen, the hollows entirely filled up in this manner.

In the variety called "avanturine," instead of the quartz being comparatively clear, it is scattered throughout it, very much in certain planes, a quantity of it may be impurity, but which is in reality mica. These particles have a light colour, and reflect the light strongly through the mass of the crystal, giving it a spangled lustre appearance, and thus produce an agreeable tint, combined with great hardness. The tint of the crystal is usually brownish, but a greenish tint is also known.

More generally useful substances belonging to this class are sandstones, or agglomerates of small particles of quartzose rock, collected as in the case of a sand bank, and cemented either by material of the same or of other kinds. When solidified they are largely used in the operations of the builder. The coarsest of these varieties is that known as "plum-pudding stone," of which we have an example not far from London, in Hertfordshire, which in the neighbourhood of St. Albans may be seen for constructing walls, &c., and for foundation stones; it is not cut with much difficulty, because of the hardness of the pebbles of which it is in great part made up. Coming next, to finer varieties, we have the millstone grit, which occurs in some time immemorial for making millstones. In particular districts it is extensively used for architectural purposes. A step farther, and we come to large rock masses of sandstone, occurring especially in the districts where the coal measures occur, and forming sometimes the greater part of the mineral matter associated with the coal. [The lecturer here referred to the sad accident which took place there, in which the miners were scattered throughout the vein, from being driven into a cavity of the vein, which prevented the walls of the vein from being driven in.] By a diagram he showed that these were worked in the mining operations at intervals in their course, forming out every 60 ft. a kind of horizontal gallery, which are protected in part by "shears" of the vein, which prevented the walls of the vein from being driven in.

Throughout the book Mr. Bonwick has been careful to keep his narrative strictly in accordance with facts; and although his object has evidently been to furnish amusement to general readers, he has succeeded in bringing together a vast amount of information of great utility. He gives abundant proof that he has lost no opportunity of making careful observations, and that he has taken the utmost care to make his record of them thoroughly impartial; his book is in every way worthy of commendation.

\* \* \* \* \* "The Mormons and the Silver Mines." By JAMES BONWICK, F.R.G.S. London: Hodder and Stoughton, Paternoster-row.

which have received and others applied for United States patents. Sparrow Hawk, Marion, Last Chance, Consolidated Camp Douglas, Silver Star, Silver Circle Consolidated, Wandering Boy, Star of the West, Silver Cloud, and Silver Cloud mill site, Red Eagle, Gentle Belle, and American Flag.  
—*Salt Lake Daily Herald*, Nov. 22.

sent day to a greyish or bluish variety. Another substance will probably be known to many of you under the name of "cornelian," having great translucency, and usually of a red or flesh colour; it is very largely employed. The name, however, is not a proper one, for the white variety it ought to be white chalcedony. In the mineral called "sard" (from a town in Asia Minor) many of the most beautiful works of art of ancient times were engraved, and are now preserved in many cases quite fresh. It is much valued by lapidaries at the present day on account of its fine texture, great durability, and capability of doing full justice to the best art of workmanship.

Not unfrequently in these quartz-like materials we meet with substances which seem to have been deposited in successive strata or laminae, often of very distinct colours, and in the hands of a skilful lapidary these colours will be brought out in beautiful direct and opposite combinations. In one variety where there is a striking contrast between black and white, or brown and white, the term "onyx" (Greek, *onyx*, the nail) is applied; and to the variety where a black and white layer is surrounded by a reddish layer at the surface, the term "sardonyx" is given. It was considered especially valuable, and advantage was frequently taken of the different coloured layers to work out a subject in the upper red layer in relief. The pale green tint of "chrysoprase" is due to the oxide of nickel. "Bloodstone," or "heliotrope," is of a dark green colour, having red spots about it from an admixture of red jasper. A number of minerals of a somewhat less degree of hardness, and containing from 4 to 7 per cent. of water in their composition, are known under the head of "opal." Everybody knows that the coloured variety is one of the most beautiful of gems, yet it never occurs in a crystalline state. It is extremely interesting with regard to the origin of these quartz minerals, for we have proof of its having been deposited from solution in no very distant period, geologically speaking. "Wood opal" (from Antiqua, &c.) is applied to a beautiful mineral substance, where portions of wood have been transformed bodily into opal, and the whole of their texture beautifully preserved; many of the woods are of the palm family. I myself had the good fortune some years ago to be present at a place in Hungary when one or two large stems of trees were dug up out of a volcanic district entirely transformed into opal. The fact was very interesting for two reasons—first, because there was evidence of the substance having been formed in connection with hot springs; and, secondly, because in the same district not very far distant is the place (the only place in Europe, and almost the only place in the world) where precious opal is found.

Under the name of "agate" a great number of minerals is brought together, and these have various classical names according to the way in which the different strata have been deposited. When they occur in cloud-like masses it is called "clouded agate"; besides which we have "fortification agate," "ruin agate," "landscape agate," &c. It was a great problem with the ancients, as to how these materials were deposited in such beautiful forms, and it is scarcely a less object of wonder in the present day, now that we are provided with more efficient means of study than those of old. Sometimes we have a mass of stalactite chalcedony, and then we are forced to conclude that it was formed drop by drop, as in the case of calcareous stalactite; and no less significant is the fact that in some of the thin veins we have on one side purple crystals of amethyst, and on the other side a white deposit of that stalactite chalcedony—the one formed by a definite process of crystallisation, the other differing so slightly from it (probably in a jelly-like state) formed in the above manner.

If we pass to regions where volcano agencies are at work in connection with water, as in the great Geysers of Iceland, we find more of this siliceous material, which is deposited from these waters in a kind of basin round the mouth. Here is a piece of stick, which, having been left in the water, is now coated with a mass, in general character like the opal, of "siliceous sinter." Similar deposits are being formed in a somewhat similar manner in the North Island, New Zealand, and from an illustration on the screen it was seen that these deposits in some places are in the form of a series of terraces, built up entirely of this siliceous matter from hot water. Again, in California, are boiling springs, throwing up large quantities of steam and water, and depositing siliceous sinter in such quantity as to render extraction of the rock very difficult. This is the place (the only place in Europe, and almost the only place in the world) where precious opal is found.

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ledge of the former, was opened to-day by an order from the District Court, and shows the largest and richest body of ore ever opened on Ruby Hill. Great excitement prevails here among mining men.—*Mining and Scientific Press* (San Francisco, Nov. 16).

## Meetings of Public Companies.

### TUOLUMNE GOLD MINING COMPANY.

An extraordinary general meeting of shareholders was held, on Monday, for the purpose of receiving reports from Mr. Hawes and Prof. Janin, and to consider the present position of the company, and to take such steps, and to adopt such measures as shall seem most conducive to the interests of the shareholders.

Capt. CARYLON SIMMONS in the chair.

Mr. E. W. LAYTON (the secretary) read the notice convening the meeting.

The CHAIRMAN said the shareholders would gather from the notice just read that the object of the present meeting was for the purpose of consulting as to the best means to be adopted to ensure the success of the company. The shareholders had been called together at the earliest possible moment after the arrival of Mr. Hawes from the United States and the receipt of Mr. Janin's report. Like all foreign mines, the directors had not the advantage of inspecting it for themselves, and, therefore, were obliged to depend upon others. Shareholders were aware that Mr. Hawes had inspected the property on behalf of the company, and as that gentleman was now present to give an account of his stewardship, he (the Chairman) had very little to say; it would be recollectable, also, that the special committee appointed some time since recommended the desirability of raising additional capital. About \$5000. was agreed to be raised upon debentures, which Mr. Hawes was strongly of opinion would be quite sufficient to give the mine a fair trial; but it was not until each subscriber for the debentures had given his consent that Mr. Hawes was commissioned to visit the mine, with the view of placing it—as Mr. Hawes said he would—in a satisfactory position. The directors had done the best in their power to promote the interests of the shareholders and to husband the resources placed at their disposal. The report of Mr. Janin was cautious, clear, concise, and exhaustive. The SECRETARY read the report of Mr. Louis Janin, jun., which, after detailing the position and prospects of the property, concluded as follows:

After due deliberation upon all the facts presented, the result of my investigation is to recommend you to continue work in depth and laterally, and to assure you that there is a very reasonable prospect of finding ores, and that, too, at no very great depth. But the work to be done must be carried out thoroughly, with an adequate supply of money and enough in excess to provide against contingencies.

The following are some of my reasons for thus recommending you to develop your mine:

1.—The district in which your mine is situated is of excellent character. There are many ore-bearing veins in the neighbourhood, and some have been successfully opened to a much greater depth than the Grizzly has reached.

2.—The appearance of permanency in the lode itself and the many slight indications that warrant a belief in the future.

3.—The fact that quartz veins usually contain segregated chimneys or ore bodies, and that in a great many instances new bodies occur in depth after the upper bodies have been exhausted.

4.—The fact that, with hoisting works already erected, accommodation for workmen, mill to test and to work ore, should any be found, you have every advantage to prospect your mine cheaply and thoroughly.

5.—Finally, there are no facts apparent to warrant an opinion that ore will not be found.

Mr. HAWES said.—At the request of my co-directors and a committee of the shareholders, I left England on or about July 23 last, for the company's property in California, fully expecting that with the funds placed at my disposal, and from the favourable reports I had received from the mine, that I should be able to place your mine in a self-supporting, if not in a dividend-paying, condition, a few weeks after my arrival at the works, so that when a rich shoot was struck we should have no leeway to fetch up; but I am sorry to say my journey has resulted in very little immediate benefit to the company, owing to the action of the board. Doubtless, your directors did what they thought the best for the good of the company. Doubtless, your directors did what they thought the best for the good of the company, but it rests with this meeting to judge between us; at the same time, I must certainly say the non-arrival of my reports placed them in a very untenable position, but the telegraph would have set matters right if it had been thought of. I arrived at Sonora, after a good run of about eighteen days, and found my agent on his way to San Francisco; but, as I had instructions from the board to obtain a report from a well-known engineer, I went to the city, and consulted my friends as to who would be the best man, and, finding the younger Janin just then to be under a cloud and fully engaged for some weeks to come, I took the earliest opportunity of securing the services of Louis Janin, the successful manager of the Gould and Curry Mine. He is not only a Professor and Graduate of Freiburg, but a practical miner and worker of ores. The great success of the Gould and Curry and the following are some of my reasons for thus recommending you to develop your mine:

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tell one from the other, and yet for that there was paid 500,000<sup>l</sup>, while the Tuolumne Company paid for theirs 20,000<sup>l</sup> in cash and shares.

The CHAIRMAN, in reply to a question, stated that there were 2300<sup>l</sup> worth of debentures issued, the holders of which would have the first charge upon the assets in the event of the company being dissolved.

Mr. Rose said if the shareholders subscribed further capital he should propose that there should be new directors and managers, so as to infuse new blood.

The CHAIRMAN said that as the object of his colleagues and himself was to ensure the success of the enterprise, they would gladly resign their seats in favour of any one who could adopt more effectual means to secure that desirable end. They still believed they possessed a very good property, and Mr. Janin's report confirmed that opinion, although it was clear more money must be expended to place it in a profitable position. There was no doubt that if the present shareholders did not find the money some one else would, and thus reap the benefit of the expenditure already incurred.

After some further discussion it was unanimously resolved—"That a copy of Prof. Janin's report be sent to each shareholder, with a request that he would inform the secretary in writing within seven (7) days thereafter whether he was in favour of subscribing additional capital (and if so to what extent) or winding-up the company."

A vote of thanks to the Chairman terminated the proceedings.

#### THE SATURN SILVER MINING COMPANY OF UTAH.

A meeting of shareholders was held at the Cannon-street Hotel, on Monday, Mr. H. W. SPRATT in the chair.

The notice calling the meeting having been read by the secretary, the CHAIRMAN said he would first make a few observations with respect to the report, and then call attention to one or two practical points in connection with which the directors desired the co-operation of the shareholders. Since the death of Mr. Crawford the chairmanship of the company had been filled by the other directors in rotation. In the commencement of their report the directors called attention to the meeting held on the 21st of August, 1871, the object of which was to ask the gentlemen there present to express an opinion upon the report which had been sent by Mr. Fowler, and to decide whether this company should take the property or not. That meeting passed certain resolutions; one was to the effect that, having considered the telegraphic report, they determined to accept the property; and, acting upon that, they got the title in order, and instructed an engineer to undertake the necessary works, so that, as soon as possible, the shareholders might realise the splendid prospects held out to them. He supposed that there was no shareholder in the room more disappointed than the directors that they were not able to declare a dividend. Doubtless the attention of the shareholders was called to a controversy in the *Times* newspaper: there was a quicksilver company brought before the public, and the editor thought proper to make certain observations, in the course of which he mentioned this company and also another, and said it was evident Mr. Fowler was a person of little importance, and assumed that the directors had taken no more trouble to find out who Mr. Fowler was than if they had been engaging a junior clerk. The directors of this company thought it necessary to send a letter to the *Times*, explaining why Mr. Fowler was selected, but the editor of the *Times* thought fit not to insert the letter, but extracted a few lines from it. He could assure the meeting that Mr. Fowler was not engaged without the fullest investigation, and he held in his hand testimonials in which Mr. Fowler referred to some of the leading men of the day in his profession, and also referred to the chairman of a company to which he had acted for some years as engineer in India; and he might mention that Mr. Crawford, the late chairman of this company, also knew Mr. Fowler in India. Since Mr. Fowler arrived in England he had talked about himself in this way—"As to my private character" he said, "I refer you to Messrs. Rothschild." He (the Chairman) had not noticed that the Messrs. Rothschild repudiated Mr. Fowler, and therefore he assumed Mr. Fowler was known to them. Mr. Fowler had also stated that he was known to Messrs. Graham, Hawkshaw, Bidder, and Mr. Edwin Clarke, and some other of the most eminent engineers of the day. Therefore, independently of the enquiries which the directors made, it seemed that Mr. Fowler was a man of some position. Whether Mr. Fowler was more of a civil than a mining engineer it was not for him (the Chairman) to say, after the experience the directors had had of him—which was not pleasing—what the directors had to complain of was Mr. Fowler's want of attention to his duties. On the 26th November, 1871, a meeting was again held, at which Mr. Fowler attended and fully confirmed his report, and he (the Chairman) would briefly call attention to one or two points which Mr. Fowler brought forward on the occasion. Mr. Fowler then talked about the large quantity of ore which was in sight, and which he valued at the large sum of 644,000<sup>l</sup>. Several questions were put to Mr. Fowler with the view of finding out, as far as possible, whether that was an imaginary idea, or not; and those who were present would bear him out when he said that Mr. Fowler answered the questions in a straightforward way, and he (the Chairman) went away with the idea that the shareholders had embarked their money in one of the most glorious enterprises ever brought under his notice. Indeed, had he not found that the representations made were to that effect, he would not have been elected a member of the board; he was not an original member, but he joined in the belief that he was joining a really good thing, and one which would give handsome returns to the shareholders. He need hardly say that he and the other directors had been heartily disappointed. When a concern paid well, the work of the directors was a minimum; but immediately it ceased to pay then came the wear and tear and vexation, and he could assure the shareholders that the board had worked hard, and had had a serious and anxious time, without a single hope of getting a penny for their services until they paid a dividend of 20 per cent., which they were not in a position to do to-day. It was not because the directors sat on one side of the table that they were to be cut off from the shareholders on the other side; they were in the same boat as the shareholders, and were generally very large holders, and in the present case the directors held one-fourth of the stock of the company; and when the time came, some time since, when money was required they looked to their own friends to help them in the moment of difficulty. He (the Chairman) would next refer to the question of the furnaces. The directors ordered them to be erected in January, but it was not until June 13 that they had the first telegram to say that the furnaces were in working order. Now, the interval between January and June was a rather long one, and the shareholders would naturally want to know why there had been so long a delay. In the first place there was a natural delay, over which the directors had no control. Nature had put her treasures in very extraordinary places, and to be found they must be diligently sought for; but in addition to the usual difficulty the company had had to contend with the further difficulties caused by a fall of snow to the depth of 10 or 12 feet, which remained on the ground a long time. On June 13, when the telegram came announcing that the furnaces were in good working order, the directors were in high spirits, for they thought there was an end of their difficulties. The first telegrams came weekly, recording the fact that they had first run \$4000 of bullion, then \$6000, then \$9000, and so on, so the directors thought the company must be making a considerable sum of money, and Col. Stanford, one of the directors, who had had a large acquaintance with mining in that district, said that the ordinary proportion of profit would be very large, and that the directors would be able to pay a handsome dividend. The directors wrote to Mr. Fowler to let them know what the profit would be, and also telegraphed from time to time asking for the same information; but it was all no use, for Mr. Fowler would give no answer, but simply kept sending word "bullion sold," so much, and in fact the directors were sold at the same time. The directors pressed Mr. Fowler still more closely, and on July 21 he sent word there were \$14,000 of profit, and that the directors would be able to pay a 10 per cent. dividend on August 1, and he (the Chairman) was free to confess that he himself bought 1000<sup>l</sup> worth of extra shares. Going on from that time the directors found they could do no good with Mr. Fowler, who seemed to have a peculiar way of his own, and the directors found out that if they had, at the outset, said to Mr. Fowler "We will pay you 700<sup>l</sup> or 800<sup>l</sup> as manager, and we forbid you to have anything to do with anything else," if the directors had said that they probably would have had a good servant in Mr. Fowler. But unfortunately not only this company's mine but also another was entrusted to Mr. Fowler's care, and the directors of this company found that their company had given a sort of *quasi* consent that Mr. Fowler might report occasionally upon other mines. Then Mr. Fowler somewhat lost his head, and no doubt the temptation to a man making 700<sup>l</sup> or 800<sup>l</sup> a year to make a further amount by reporting on mines was great, at any rate, he gave this company the minimum of attention. The directors stopped this as soon as they could, but by that time the damage generally was done. Mr. Fowler seemed to have paid attention to those who paid him best, and this company and the other company to which he had alluded had very little of Mr. Fowler's time, and of course both suffered considerably.

A SHAREHOLDER said he took his salary?

The CHAIRMAN: He made a claim. A gentleman who was over there at the time, in whom the board had confidence, consented to visit the mine at the request of the directors. On looking into matters this gentleman found the accounts in a dreadfully state; regular books had been kept, but the accounts had been kept on pieces of paper—in fact, the affairs of the mine were "at sixes and sevens." The directors thought—"That will not do for us; we are entrusted with certain sums of money, and we must see that they are applied to the purposes for which they were intended." The directors gave great offence to Mr. Fowler as soon as he found he could not go to the bank and draw right and left. He supposed the directors had rubbed Mr. Fowler up the wrong way; they sent word that he must obey them or resign, and Mr. Fowler sent word back he would do neither. The next day the directors dismissed him. It was an exceedingly difficult thing to manage a property thousands of miles away from London, and which it took three weeks to reach. He did agree to go himself, but at the last moment the journey fell through, as the gentleman who had agreed to accompany him was unable to go. The next point was with respect to the injudicious purchase of ore. At the Saturn Mine proper, instead of 644,000<sup>l</sup> worth of galena in sight, we had the bulk of pyrites. Of course, this was a great disappointment to the board of directors. Whether Mr. Fowler was to blame he really did not know, although the directors had a certain opinion upon the matter. The change from galena to pyrites was said to be so sudden that it was possible he took a piece of ore, on the one side galena and on the other pyrites. Let them give the man the benefit of the doubt. If Mr. Fowler had known it would have been honest if he had confessed it at once; but he said, "I am going through the pyrites, and shall get to the galena shortly." The directors had to buy ore, not only for flux, but also to keep the furnaces going. If Mr. Fowler had attended to his duty the company would now have been able to divide a large dividend, but the temptation to report on other mines was too great, and he left this company to the management of inferior workmen, and the working had entailed a loss. But the accounts had not yet arrived, and he could not tell the exact amount, but he would return to the subject again. In starting the affair a great blunder was made. The original capital of the com-

pany was 75,000<sup>l</sup>, of which 65,000<sup>l</sup> was devoted to the purchase of the mine, and the other 10,000<sup>l</sup> to preliminary expenses and to erect furnaces. He could not say who was to blame. They were all shareholders, and all read the reports and believed them. On Saturday last, although the directors could not give a proper account, they had drawn up an approximate statement, which would give the shareholders some idea of how the affairs stood. He was tempted to do so, because one shareholder thought proper to write a letter, wherein he stated that the directors had had 35,000<sup>l</sup> of working capital, and had made considerable profits, and wanted to know what had been done with the money. Therefore, he had an approximate balance-sheet drawn up. The debtor side of the balance-sheet showed that the capital was 75,000<sup>l</sup>, less 500<sup>l</sup> for 100 unallotted shares, and 600<sup>l</sup> for arrears on calls, so that the capital left was really 73,950<sup>l</sup>, which the directors were entrusted to deal with. With respect to the calls in arrear, he questioned whether it was worth spending 10<sup>l</sup> to try to recover them; the amounts were due from a class of persons from whom he believed nothing would be recovered, and therefore, perhaps it was better for the shareholders to at once make up their minds to lose the money. It would also be seen that there was an item of "loan account, including bills payable, 9278<sup>l</sup>, 13s. 1d." It would also be seen that the directors added the following note—"N.B. This does not include liability on sundry accounts owing, the amount of which is not yet known. It is also irresponsible of the accounts from the mine, which had not yet been correctly sent in." The first part referred to two items; the first was the solicitor's charges, and the shareholders would be astonished to know that there had been a solicitor who for a year and a half had not sent in his bill. (A laugh.) However, he did not suppose it would be very heavy, and, therefore, the shareholders need not be afraid of it. The other was an amount due to the accountants for opening the books, and that also was an amount at which the shareholders need not be alarmed. On the disbursement side, the purchase of the plant cost 65,000<sup>l</sup>; the bankers' charges and commission in respect of the same 180<sup>l</sup>, 18s. 7d., making together 65,180<sup>l</sup>, 18s. 7d. The preliminary expenses were 1646<sup>l</sup>, 16s., and office furniture 115<sup>l</sup>, 10s. 9d. Now he came to the one item which he wanted the shareholders to look at seriously, for if they understood that they understood exactly the bugbear which stared them in the face. It was—"Cash remitted to manager for working mine and erecting furnaces and machinery, plant, &c., 12,500<sup>l</sup>." Now, the whole of that amount was to be accounted for. That was the worst state of things—that 13,000<sup>l</sup> odd was to be accounted for. The directors knew that a certain amount of work had been done; they knew that heavy salaries had had to be paid; there were three furnaces erected; they had all the plant and machinery, and 20 acres of land by the side of the railway; there was the boarding house, the coal-house, and so on; therefore, looking at the worst, they knew that 13,175<sup>l</sup> was the outlay in America. If they looked at it in comparison with the returns which had been made, they would be able to see what the smelting works would do, surmising for a moment the question of the mine be that the outlay of 13,175<sup>l</sup> was bringing in about 18,000<sup>l</sup> a year. That he believed was a small sum compared with what would be received if the thing were properly worked, because he had the data to show that they made 800<sup>l</sup> a week net from the property a few weeks ago. In one of the weeks he found they made net \$1198<sup>l</sup>, in the next \$1940, and the next \$880. This falling off was accounted for by the fact that the smelters liked to take the best stuff first, and then they went on to the worst stuff last. But when they had a large amount of ore they could mix it, and so obtain average returns. In the next week they had returns of \$888, then \$887, and the next \$4007. That was the result of the work done. He believed that was the sheet. In fact, there was no difficulty, if they had proper working capital, in making 800<sup>l</sup> net per week. If that were the case, although the directors deplored that the manager had lost a year and six months still, if the ordinary working capital were provided, they would get a return which would pay 20 or 25 per cent. upon the capital including the new capital which the shareholders would be asked to raise. The expenses of London management had been kept down as low as possible. The general expenses had been 51<sup>l</sup>, 11s. 6d.; the telegrams (necessarily a heavy item), 144<sup>l</sup>, 0s. 3d.; advertising, 60<sup>l</sup>, 11s. 5d.; interest, 708<sup>l</sup>, 5s. 1d.; original directors' fees (being an amount voted at the last meeting of shareholders), 300<sup>l</sup>; present directors for year *ad lib.*, they having agreed not to charge anything until they paid a dividend of 20 per cent., and therefore had worked a year for nothing. The salaries were 353<sup>l</sup>; the rent 130<sup>l</sup>; the stationary, printing, account books, certificates, warrants, &c., 150<sup>l</sup>. That last was always a heavy item in the first year of a company, as it included the opening of the books and so on. There was for stamps on warrants to bearer 875<sup>l</sup>; that, of course, the directors could not help. If they took the trouble to total up the various charges it would be seen that they amounted to 4998<sup>l</sup>, and left practically only 5000<sup>l</sup> as working capital to go on and work the mines and pay heavy salaries, which was, of course, an inadequate amount. The manager at once wanted 4000<sup>l</sup> for coals—that was one item, and the shareholders must at once see that it was absurd and ridiculous in a company of this description to hope to carry on a good business with the trumpery capital of 5000<sup>l</sup>, especially when they had to lay out a large sum in erecting works. He believed that the furnaces and works had cost about 10,000<sup>l</sup>. There was no doubt that the profit of 800<sup>l</sup> a week could be made continuously if they had the capital to work the property efficiently. Although the directors were very angry with Mr. Fowler for the mess he had got them into, yet they must render him this just— that in putting up the furnaces on the line of railway he condoned a good deal of folly, because if he had erected them on the railway the company might have been ruined. But the Sandy Station, where the furnaces were erected, was an excellent place for bringing ore to, and the company would derive a good business if it had money to buy the ore. That was why the directors were about to ask the shareholders to raise extra capital. It was proposed to raise it in the form of debentures. There was no doubt that the 800<sup>l</sup> a week could be kept up if they had the money to buy the ore. As regards the mine itself (of which he had not yet spoken), although the directors had not yet received the report which they were to receive from some of the leading men out there, still they had received certain private information that they had a very valuable property, but they had to go down to it. When the pyrites were passed they came to a bed of galena, and he believed they had a hanging wall and a footwall, with a good fissure vein, and notwithstanding the company would make a good thing. But they had no money, and under those circumstances they would not touch the mine to make any considerable outlay until they had proper funds. He believed that a few thousand pounds expended on the property would give a satisfactory supply of ore; but, if they had not that, they must buy ore from different persons in the neighbourhood. The directors were not prepared to say that they wanted any amount in particular. The company now owed about 10,000<sup>l</sup>, which the directors had honoured from their friends. And there was, as he had said, money at once wanted for coals and other necessities. The directors proposed to take powers to borrow 25,000<sup>l</sup>, but there was no intention to spend that amount. They would like to have sufficient to pay the money borrowed, and then they would be able to pay a dividend; they would also like to have sufficient to buy ore. The directors proposed to make up the accounts to Sept. 30, which would be as near as possible one year from commencing operations. As he did not consider Mr. Fowler worth anything, he would not advise the shareholders to look to that gentleman for any return of the money, even if he were made responsible. Starting from the time when the company began to make profits, he believed they would be able to pay a dividend at the rate of 10 per cent. per annum in January, and afterwards, he hoped, at the rate of 20 per cent. The directors considered that the shareholders were under obligations to Mr. Tracey and Mr. Valentine for the support they had rendered; if they had not had Mr. Valentine out there, with his influence with Messrs. Wells, Spargo, and Co., he believed that this company would have been ruined. He, therefore, thought the shareholders ought to give a vote of thanks to those gentlemen. He was sorry that Mr. Valentine could not remain out there long, but some one must be sent out from this country to look after the interests of the company. He might mention that Mr. Valentine had not received a penny for his services, and would not accept it. Mr. Blythe, the retiring director, who offered himself for re-election, was one of the most painstaking members of the board, and his colleagues would be very glad indeed to see him re-elected. In conclusion the Chairman moved the adoption of the report.

Colonel COWPER thought that the shareholders were not in a position to adopt the report, and still less to issue debentures. It was absolutely necessary to have full and detailed accounts. He thought that there were several points which required explanation, and that a committee of three shareholders should be appointed to make an investigation, with power to employ an accountant.

The CHAIRMAN: What are your points?

The CHAIRMAN said he really thought that Colonel Cowper could not have understood his remarks. He had already explained that in the absence of proper accounts from the mine the directors had been unable to make up properly audited accounts; but, wishing to give all the information they could to the shareholders, the directors had made up approximate accounts, but he did not propose that those approximate accounts be accepted.

Colonel COWPER went on to say he thought that the shareholders ought to have been earlier made aware of the fact that the working capital was not sufficient. He thought, further, that explanation ought to have been given of the state of the mine, and also more information respecting the expenses in this country. He should like to know the names of the gentlemen from whom the directors borrowed money, and at what interest. Seeing the difficulty of controlling a property at such a distance, he should like to know to what extent the directors intended to delegate their powers to some one at the mine, especially with regard to drawing bills. He also thought the shareholders should have undeniable proof that the company's title to the mine was indisputable. The shareholders should know the exact nature of the agreement with Mr. Fowler, and whether any remedy could be had against that gentleman in the event of his having committed any impropriety. He should like to know the date of Mr. Fowler's dismissal. He complained that up to the present moment the company was not quoted on the Stock Exchange, which was a great drawback. Seeing that only 10,000<sup>l</sup> or 14,000<sup>l</sup> was wanted, he did not see what necessity there was for the issue of debentures to the extent of 25,000<sup>l</sup>. He referred to some other important points, and said he thought the shareholders ought to have as much information as the directors possessed.

Mr. T. G. TAYLOR thought it would be a waste of time if all the information asked by the last speaker were given at a public meeting. He complained of the time at which the meeting was called, which he thought was inconvenient to many gentlemen. He suggested whether it would not be advisable to adjourn for a month, when probably the directors would be able to give more information.

The CHAIRMAN said there was no difficulty whatever in answering every question put by Col. Cowper, and the directors did not shirk any enquiry. (Cheers.) With respect to the time at which the meeting had been called, it had really been fixed for 3 o'clock in the belief that it would be more convenient for gentlemen who had their business to attend to in the middle of the day. As regarded a committee of enquiry, he really did not know what there was to enquire into—(hear, hear)—and as to adjourning the meeting, if that were done without authorising the issue of the debentures it would have a serious effect upon the prospects of the company, because the money was wanted at once. The directors had large stakes in the company, and had worked hard to make it a success. If the board had not the confidence of the shareholders they could elect other directors—(No, no)—but if they had confidence in the directors let them assist them to the utmost of their power in making the company a success. (Cheers.)

Mr. GOLDSMITH seconded the resolution of the Chairman, and expressed his firm belief that the directors had exerted themselves to the utmost to promote the success of the company. He thought it showed a want of business to talk as Col. Cowper had talked, and to ask for explanations on all the points which he had brought forward at a public meeting of this kind. He expressed his opinion that the shareholders would act wisely in authorising the directors to issue the 25,000<sup>l</sup> of debentures.

Mr. MARSHALL at some length criticised the action of the directors.

The CHAIRMAN, after replying to one or two unimportant observations, said—Have you confidence in us or not? If not, say so. There is not a man at this board who cares whether he stops here or not. We are perfectly independent, and we mean to be so. We are shareholders, and because the table divides us, it seems that we are to bear the labour and burden of the day. We will not stand under any insinuations, because they do not apply. (Loud cheers.)

Col. COWPER said he made no insinuations, nor did he say he had no confidence;

he simply said he was not able to form any judgment as to the present state of things, and suggested that further information should be given.

Mr. KEMP said that from the lucid and straightforward statement of the Chairman, he was satisfied that everything possible was being done by the directors to promote the welfare of the undertaking. He hoped the shareholders would support the directors in their efforts to develop the property.

The SOLICITOR explained that his bill had not been sent in, simply because it had not been asked for, but it was quite ready when required, and he could assure the shareholders that they would not be alarmed at the amount.

After some further unimportant discussion the resolution for the adoption of the report was put and carried unanimously, and the CHAIRMAN stated that as soon as the accounts were received and put in order they should be put into the hands of the shareholders.

On the motion of the CHAIRMAN, seconded by Mr. ECKERSLEY, Mr. Blyth was re-elected a director.

On the motion of a SHAREHOLDER, seconded by Mr. BLYTH, Dr. Bishop was then elected a member of the board.

Dr. BISBRO, in acknowledging his election, said he was practically acquainted with mining, and also with this company's mines, and had no doubt that if the smelting works were properly carried out the company would be able to realise a good income. He agreed with what the Chairman had said with regard to Mr. Fowler having exercised a wise discretion in placing the furnaces near the railway station.—Mr. BLYTH also acknowledged his re-election.

Mr. MARSHALL was also proposed as a director, but Mr. TAYLOR moved as an amendment that no addition should be made to the board at present, and this amendment, upon being put to the meeting, was carried.

The CHAIRMAN next proposed a resolution to the effect that the directors be authorised to raise such a sum of money as may be required for the present purposes of the company, not exceeding in the whole 25,000<sup>l</sup>, by the issue of debentures, at an interest not exceeding 15 per cent. per annum. He said that though the directors took power to issue £25,000<sup>l</sup>, they had no intention of issuing the full amount.

The resolution was seconded by Mr. KEMP, and carried.

A vote of thanks was then passed to the Chairman and directors, and the meeting broke up.

unforeseen accident occurred, which they did not contemplate, the board hoped next autumn to open the whole line and system. The best quantity of materials had been sent out, so that renewals would not be required, at least, during the lifetime of the present shareholders, and perhaps something beyond that. (Hear, hear.) He then proposed that the report and balance-sheet be received and adopted.—**MR. F. BRABY** seconded the proposition.

**MR. SAMUDA** asked what number of shares had been allotted?—**MR. HEAD** said that every shareholder had reason to be satisfied with the prospect of the company, as shadowed forth by the Chairman, and it was only justice to the board to congratulate them upon the small expenditure on account of salaries and office expenses, &c. Those items appeared to him to be extremely moderate.

A SHAREHOLDER had observed that the miners in Bilbao had had some communication through the International Association with the miners in this country with respect to wages, which might prevent English miners going to Spain. He should like to know if such were the case whether it was likely to affect the interest of the company?—**THE CHAIRMAN**, in reply, stated that 6100 shares had been allotted the share list was closed at 5000, which was considered would be sufficient for their present wants, and that in the event of more being required it would be only fair to offer them in the first instance to the present shareholders. But after that applications were received for considerable numbers from the people of Bilbao, and the directors considering it very desirable to secure as much interest and influence as possible in that direction re-opened the share list, and allotted 240 more shares—some paid-up—to influential parties in Bilbao. Since then further applications had been made for shares without the directors having sought for them, but which they felt bound to allot. After due deliberation, and in view of the circumstances arising in connection with the double line of railway and the certain increase of the cost, owing to the increased price of materials, the directors had decided, with the shareholders' sanction, to leave the share list open to the extent of 7500 shares; there would be no difficulty in getting the additional number taken up, but the directors thought that no issue beyond that number should be made without being in the first instance offered to the shareholders. That was 1400 more than is present taken, for one-half of which applications had been already received. He thought the additional cost of doubling the line would be from 30,000/- to 50,000/- the land was taken for a double line, so that the great additional cost would be for the rolling stock for working 1,000,000 instead of 500,000 tons per annum. In the survey of the port the company was committed to 2000; it was not the intention of the board to commit the company to anything more than a survey; the whole of the iron interest had contributed in proportion. The expropriation of the land for the railway was estimated to cost from 9000/- to 9000/- and it had been exceeded by only 1000/- but an enormous price was now being demanded, which he found other parties had to pay. He was happy to state that they did not require any English miners—their operations had not required but quartzing. There was no difficulty in obtaining any amount of labour at reasonable rates. As to the quotation in the Stock Exchange List, sufficient shares had not yet been issued to justify them in making an application, but when the proper time arrived the necessary steps would be taken.

**MR. SAMUDA** urged upon the board not to seek to make preparations on too large a scale before they had the means of meeting them. There was only one way in which companies could be successfully worked out, and that is where the shareholders had one individual interest. He hoped the directors would take care not to outrun the constable, and to do all that was necessary for a moderate output, allowing the profits to be the means of increasing the scale of operations. He advocated the issue of the whole of the unissued shares.

The CHAIRMAN said the board had given the matter their serious consideration. The motion adopting the report and accounts was put and carried unanimously.

**MR. FOWLER** proposed the re-election of the auditors—**Messrs. Chadwick, Adams, and Co.**, which, being duly seconded, was put and carried unanimously.

Upon the proposition of **MR. MANDREW**, seconded by **MR. HEAD**, it was unanimously agreed that the sum of 1000/- be voted to **MR. JAMESON** for the services he had rendered and is rendering to the company in Spain.

It was mentioned that there are 2500 unissued shares, and it was arranged that the allotment of shares should be left in the hands of the directors.

A vote of thanks to the Chairman and directors terminated the proceedings.

#### DOLCOATH MINING COMPANY.

The two-monthly meeting of adventurers was held at the mine, on Monday,—**SIR F. M. WILLIAMS, M.P.**, in the chair.

The financial statement showed that the labour cost and wages for October and November amounted to £684/-, merchants' bills to £3682/-, and water rents for one year to £196/-, making a total of expenditure of £10,563/- The credit side set forth that the sale of copper ores had realised 117/-, 206 tons 18 cwt., 17 lbs. of tin ore, 17,771/-, which, with dues deducted and other trifling receipts, made a credit of £17,031/-, the profit for the two months' working having been £4671. Out of this a dividend of 1/- 10s. per share was paid, which amounted to £444/-, and the balance left with that held over at the last account made a credit of £1537. The agents' report was as follows:—

The engine-shaft is sunk 11½ fms. under the 302. We expect to begin to drive at the 314 in about a month. The winze under the 302, east of engine-shaft, is worth for 9 feet long 100/- per fathom. The 302, east of New East, is worth 30/- per fathom, but more lode is standing to the south, which we have cut into a few fathoms behind the end, which is of greater value. The winze under the 290, east of New East, is worth for 9 feet long 40/- per fathom. The 302, west of engine-shaft, is worth 15/- per fathom. The old sump-shaft, sinking under the 290, is producing a little tin. The 290, east of New East, is worth 15/- per fathom. The 290, west of Old Sump, is being driven on the north part of the lode, which is not of much value. The south part, when last seen, was worth 80/- per fathom; but we are driving on the north part for greater speed, in order to unwater the winze under the 288, where the lode is standing to the south, which we have cut into a few fathoms behind the end, which is of greater value. The winze under the 290, east of New East, is worth for 9 feet long 40/- per fathom. The 302, west of Old Sump, is worth 15/- per fathom. The 212, west of Harriett's, there are two crushings—one of 110 tons, and another of 93 tons—which produced 111 ozs. 15 dwts. and 60 ozs. 10 dwts. retorted gold respectively, being in one case over an ounce to the ton, and in the other instance 13 dwts.

Such are a few details illustrating the progress which is being made in the development of the mineral wealth of the Antipodes. Our narrative is necessarily fragmentary, but it shows that a great deal is being done. It should, perhaps, be added, with regard to Tasmania, that iron ore has been discovered in the northern part of the island; it is also known to exist in the southern districts. Mining companies are spoken of, and the opening up of iron mines will probably lead to the development of the coal fields of the colony. Altogether, it would seem that, with the help of mining industry, the development of their vast meat supplies, and the great development of pastoral pursuits, the Australian colonies are making steady and satisfactory progress. The results are seen in the greatly improved credit of each colony. Instead of borrowing upon the London money market, the New South Wales Treasury has begun to issue debentures at Sydney. On Oct. 16 the New South Wales Treasury offered to the colonial local public Five per cent. New South Wales Government Debentures to the amount of 406,800/-, redeemable in 30 years. The aggregate sum tendered for was 1,166,000/-, and the whole of the loan was placed at from 103/- 11s. 1d. to 106/- It need scarcely be said that this satisfactory result shows an accumulation of wealth in New South Wales which did not exist 10 or 15 years since. South Australia and Queensland are proposing to issue Four per Cent. Debentures—another proof of the growing strength of Australian credit, thanks to the development of the vast natural resources of Australasia.

The CHAIRMAN stated that at the committee meeting held that morning Capt. R. Pearce had applied for an increase of salary, and the committee, after taking into consideration that he was the only agent living on the mine, and the extra duties thereby entailed, as well as recognising his valuable services as an agent, recommended that he be allowed 24/- per annum for house rent, and 1/- 10s. a month additional salary. This was agreed to. The Chairman then stated that the committee had also under their consideration a recommendation from Capt. Josiah Thomas in consequence of the alteration of the system of payment to the four weeks, that the accounts of the mine should in future be held once in 12 weeks instead of once in two months. If that recommendation were agreed to their next account would come as usual in two months' time—in February—and the one following that would not be until May month.

Captain J. THOMAS explained that in the present system they were paying their labour costs every four weeks—13 times a year—and only charging two months' labour costs at their account meetings, so that at the end of the year they would have a month's labour cost in arrears. Nearly all the mines in the county were holding their meetings quarterly except themselves, and he thought it would be for the better plan to have a 12-weeks' account.

On the motion of Captain J. MAYNE, seconded by **MR. J. HOLMAN**, the recommendation was agreed to.

Capt. J. THOMAS then stated that at the last meeting they charged £2 tons of tin that they had not then sold, but which was in stock. A fortnight after the meeting, however, the tin standard went up, and the tin was then sold with an increased profit of 150%. The standard shortly after that was lowered again, so the shareholders might consider themselves fortunate. At present the price of tin was 12/- less than it was at that time; but they could scarcely expect that the tin would always remain at the very highest price reached, and if coals and iron and other materials would go back a little the price of tin would not be so bad after all. With respect to the future of the tin trade, some people in Cornwall seemed to be very frightened about the Australian tin, and afraid that it would ruin them; but for himself he had no such fears, and he hoped the new year would show an increase in the price of tin. The mine looked as well now as ever. In the 236 they had a lode worth 80/- per fathom, and in the 302 they were driving through a very profitable lode for 35 fathoms long, worth on an average from 120/- to 150/- The engine-shaft was down nearly 12 fms. deeper than at the last meeting, and they hoped to drive at the 314 in the course of the next month. If that turned out well it would be a very valuable thing for them, for they never had a better lode than the 302, and they were looking forward with great anxiety to the driving of the 314.—A vote of thanks to the Chairman concluded the business.—*Western Morning News*.

#### GREAT WHEAL VOR UNITED MINING COMPANY.

The quarterly general meeting of the shareholders will be held on Thursday. The profit and loss account for the three months ending September shows—

Black tin sold—August	£1800 6 1
Ditto—September	2023 3 3
Ditto—October	1878 13 1
Tribute and royalty on tin sold from Rose-ladon, &c.	116 16 0
Returned income tax	185 3 9
Old material sold	80 0 0
One year's rent at Poldown	65 0 0
Cash balance	7 8 10 = £26159 1 0
Mine cost—July, August, and September	£3904 19 1
Merchants' bills	1974 2 4
Dues	355 16 5
Bundries	130 19 3 = £5665 17 1
Balance (profit)	£ 493 3 11

During the three months ending Sept. 15 there were 50 fms. 3 ft. 2 in. of ground worked and driven.

**WICKLOW COPPER MINE COMPANY.**—The adjourned general meeting of shareholders was held in Dublin, on Thursday (Dr. Percival Wright in the chair), to receive the report of the committee of shareholders appointed to investigate the books and affairs of the company. The Chairman stated that Mr. Octavius O'Brien was absent, in consequence of being in London as witness on trial. Mr. Roldan, the secretary of the committee, read the report. The general management of the company was found most defective. The books were in an unsatisfactory state that the committee had to call in a public accountant. The stocks are stated to have been over-valued, and it was complained that 100/- given to a church building fund was first charged to contingencies, and thence transferred to capital account. The report was received, and ordered to be printed and circulated,

with the directors' reply thereto, among the shareholders, and the meeting was adjourned until Jan. 11.

**WHEAL DAMSEL UNITED.**—At a meeting of adventurers, held at the mine on Dec. 4, the accounts showed a debit balance of £644. 5s. 5d. A call of 2/- 10s. per share was made. Capts. A. T. James and John Whitburn say—"Our confidence in the ultimate success of the mine is unabated, and by a vigorous development of the new tin lode we have every reason to believe a profitable and permanent mine will be established."

[For remainder of Meetings see to-day's Journal.]

#### MINERAL WEALTH OF AUSTRALIA.

The activity which is displayed in connection with mining matters in Australia is very remarkable. The receipts of gold by Government escort at Sydney from the gold fields of New South Wales amounted in the first nine months of this year to 267,670 ozs., as compared with 203,849 ozs. in the corresponding period of 1871. The discovery of rich and extensive tin mines in the vicinity of the border line between New South Wales and Queensland—partly in Queensland and partly in New South Wales—has had the effect of directing capital and labour to that locality, and of creating a somewhat extensive traffic across the northern boundary. Owing to the sudden opening up of stanniferous country in New South Wales, the New South Wales Lands Office has not been in a position to get through its work to the satisfaction of all parties, and numerous complaints have been made public by applicants who having selected land, and paid the usual deposit, are not able to obtain their leases or get a refund of the amounts paid by them. It is stated that on the Cowflat Copper Mining Company's ground, in the Bathurst district of New South Wales, a solid lump of ore weighing upwards of 35 cwt. has been discovered; the workmen have already sunk 22 ft. into the lode, but have not yet passed through it. Nothing very special calls for notice in connection with gold mining in Victoria, but the position of this branch of Victorian industry is satisfactory, the excellent yields which have been obtained during the last two years being well kept up, while quartz mining has been still further extended. As regards South Australia, there has been some little excitement in respect to gold discoveries in the northern territory. Several reefing parties have been formed, and large numbers of claims have been taken up; at the last dates, the population of the territory was fast increasing, and some of the new arrivals were prosecuting their search for gold in the immediate outskirts of Palmerston. In Queensland there has been an extraordinary rush to Charter Towers; an exceptionally rich lead was discovered, and some of the Victorian miners who went to the spot wrote to their friends to the effect that a second Bendigo had been met with. At least 2000 miners and others were induced by these representations to make their way from different parts of the Australian colonies to this new El Dorado; but the auriferous drift soon ran out, and at the last dates some of the disappointed miners were returning to Victoria "sadder and wiser men." Indications of a heavy deposit of copper in the Enoggera ranges in Queensland have been discovered.

The mining interest of New Zealand appears to be tolerably prosperous, although the excitement which prevailed some months since has subsided. It was stated at the annual meeting of the Caledonian Company, on the Thames gold field, that the dividends paid by the company during its past financial year had amounted to £154,440/- The quantity of stone crushed by the company during the year was 15,777 tons, which yielded 73,732 ozs. of gold. The New Zealand Parliament has agreed to offer a reward of 5000/- in each island of New Zealand for the discovery of new gold fields. A good deal has been done of late in developing the mineral resources of Tasmania, and the yield of gold in that colony has displayed a tendency to increase. A cleaning up took place at the Caledonian Company's works, at Fingal, on Sept. 12. From 210 tons of stone there was a yield of 671 ozs. amalgam, which produced 214 ozs. of retorted gold, or 4 ozs. over an ounce to the ton. About 200 tons of stone were crushed a fortnight previously, which yielded 100 ozs. retorted gold. At the City of Hobart claim, Fingal, there have been two crushings—one of 110 tons, and another of 93 tons—which produced 111 ozs. 15 dwts. and 60 ozs. 10 dwts. retorted gold respectively, being in one case over an ounce to the ton, and in the other instance 13 dwts.

Such are a few details illustrating the progress which is being made in the development of the mineral wealth of the Antipodes. Our narrative is necessarily fragmentary, but it shows that a great deal is being done. It should, perhaps, be added, with regard to Tasmania, that iron ore has been discovered in the northern part of the island; it is also known to exist in the southern districts. Mining companies are spoken of, and the opening up of iron mines will probably lead to the development of the coal fields of the colony. Altogether, it would seem that, with the help of mining industry, the development of their vast meat supplies, and the great development of pastoral pursuits, the Australian colonies are making steady and satisfactory progress. The results are seen in the greatly improved credit of each colony. Instead of borrowing upon the London money market, the New South Wales Treasury has begun to issue debentures at Sydney. On Oct. 16 the New South Wales Treasury offered to the colonial local public Five per cent. New South Wales Government Debentures to the amount of 406,800/-, redeemable in 30 years. The aggregate sum tendered for was 1,166,000/-, and the whole of the loan was placed at from 103/- 11s. 1d. to 106/- It need scarcely be said that this satisfactory result shows an accumulation of wealth in New South Wales which did not exist 10 or 15 years since. South Australia and Queensland are proposing to issue Four per Cent. Debentures—another proof of the growing strength of Australian credit, thanks to the development of the vast natural resources of Australasia.

The RECKLESSNESS OF A COLLIERIES ENGINEMAN.—We are thankful that it does not often fall to our lot to record wilful offences on the part either of our colliers or of men having charge of colliery apparatus. Offences of this class are, however, now and then brought to light; and such a one came out on Monday last before the county magistrate in Wolverhampton. Because of its heinousness we direct attention to it here. One Samuel Blower, who had worked at the Mosley Hole, near that borough, belonging to Messrs. Styler and Hough, had displayed recklessness in the management of his engine; and his employers determining to get rid of him, gave the customary notice for a reduction in his wages, and he left. His successor could not pump water into the boiler; one of the valves of the pump had been cut with a chisel. There could be no doubt about this having been maliciously done, nor was there much reason to doubt that Blower had done it. He alone had had charge of the engine, and if this was not evidence sufficient, then out of his own mouth he stood condemned. To an acquaintance who passed him after his dismissal and when the attempt was being made to get water into the boiler, Blower, in response to a remark that they were not working at his old place, observed that he had "put a cure on them." Further, the day before his notice expired he showed a witness a piece of lead, which he said he "was going to put down the pump." After this evidence it will not be surprising that the Bench should have convicted; the surprise would have been if they had not. Messrs. Styler and Hough claimed 30s. only as damage, although their loss had been about 12/- This 30s. the man was ordered to pay, and he was further mulcted in a fine of 5s. Altogether he will have to find about 10/-, and if that should not be forthcoming, upon distress if need be, then he will go for two months hard labour. We trust there are very few engine-tenters at any of our collieries who will not add "And served him well right." Let us add that we trust the case will be a caution to any ill-conditioned engine-tenter anywhere else in the kingdom who should be malicious enough to imitate this man. It must not be forgotten that inasmuch as the pump was worked by the engine, and that as steam was got up by the water that was allowed to remain in the boiler after the damage was done, Blower's malice might have resulted in the explosion of the boiler. His offence was correctly described by his solicitor, who admitted that "If the statement for

the prosecution was correct, then the act was most dastardly and un-English, because not only was considerable destruction of property hazarded, but the lives of many innocent fellow-workmen who had done Blower no injury, were placed in jeopardy."

**OPENED LAMP TOPS.**—It is seldom that the offence of opening the top of a safety-lamp in a colliery is attended with consequences that more appeal to our sympathies when three deaths are the extent of the fatality than those made known in respect of the death of a man and two boys on Monday, last week, at the Featherstone Main Colliery, near Pontefract, soon after midnight. A collier at the ripe age of 40, named Phenox, went down to report if all was right, and he took with him a boy of 13, named Cawthorn, and another a year older, named Livsey. No report was sent up, and upon a descent being made all three were found dead, from the result of an explosion. Phenox had the top of his lamp off, and a blower of gas followed fitfully, all three were killed without warning. It is in every way unsatisfactory to have to stricture the conduct of a man whose folly has brought about his own death—and so, no doubt, the coroner's jury felt when, by their verdict, they visited the consequences upon Phenox's recklessness—but our duty to the living demands that it should not be overlooked that this man went down charged with the duty of reporting upon the safe condition of the workings; that he had in his charge two youths who were to be trained by him, and whose future carefulness or recklessness whilst at work, together with the effect of such conduct on others, would depend much upon the training he gave them. Again, one of them had that night descended a shaft for the first time in his life, and he was the son of a widow whom Phenox was this Christmas-tide to make his wife. If with all these special reasons for caution such conduct is still pursued, what have we not to fear from men otherwise circumstanced? Recently we have had occasion to congratulate our colliery managers that with vigorous mercifulness they have sought to have such offences heavily punished by the authorised administrators of the law. We regret that we cannot include in such commendation the manager of the Welsh Whittle Colliery, near Chorley. By unlocking his safety-lamp a collier had risked the lives of some 50 of his fellows, yet, as the offender happened to have a wife and family, that gentleman asked the Chorley magistrates to deal leniently with him. We share in the surprise expressed by the justices that such an application should have been preferred, but, as it was preferred, we are not astonished that the award should be a fine of 40s., and not unconditional imprisonment. Let it be hoped that whilst there are many colliery managers equally kind-hearted with Mr. Dickinson, there are few who, under similar circumstances, would have allowed their kindness to run in the direction of the misapplied mercifulness here set forth.

**THE SHAFT ACCIDENT IN SHROPSHIRE.**—The numerous accidents that we have lately had to record at our collieries may well occasion the fear that though there has been no terrible explosions in the past month, either in Wales or in the North of England, the aggregate of deaths will not, when the Inspector's returns are made up, prove to be much under the average. Close upon the loss of 22 lives by the Pelsall inundation we have the death of eight colliers in the neighbouring field of Shropshire. The poor fellows worked at the Springwell Pit, at Dawley, belonging to the Coalbrookdale Company, and were being drawn up the shaft on Friday afternoon, when the chain snapped, and falling 50 yards they were killed. Like only too many of the shafts in the coal fields of Mid-England, this shaft was not furnished with guides affixed to the sides of the masonry, and the skip could not, therefore, be provided with catches, by which in the event of the breaking of chain the descent of a cage in the shaft may be arrested. Happily the number of such shafts will become less every succeeding year. With them there will also go out the use of the cumbersome draw chains. These, though flat-linked, and an improvement upon the hempen ropes, which they succeeded, yet must in their turn yield to the applicability of steel-wire to rope making. Most of the pits of modern date in Shropshire have wire draw ropes, and if they have not inflexible, still they have guides of wire-rope also. Of the condition of the severed links, which led to the catastrophe, we have nothing now to say. The proceedings at the still-pending coroner's enquiry will make known whether they were in that state that should have led to their removal. The Coalbrookdale Company are one of the foremost firms in Shropshire. They may, therefore, be assumed to have neglected no ordinary precautions. In anticipating the future, let us congratulate ourselves upon the effect in reducing risk by such accidents that will follow upon the operation of the new Mines Regulation Bill.

**COLLIERY FIRE IN LANCASHIRE.**—Pain

## FOREIGN MINING AND METALLURGY.

At Rotterdam tin has been the subject of great variations. On the one hand, the smallness of the disposable stock has a tendency to support prices; on the other hand, the dearness of capital and some failures which have occurred at Amsterdam will, probably, render it impossible to maintain quotations. At the same time, we must not lose sight of the consideration that 39,000 ingots of Banca will have to suffice until April, that discount has a tendency to fall, and that the deliveries of Straits tin from Singapore and Penang to London are insignificant. The last prices which have reached us from Holland are 86*fls.* for Banca and 82*fls.* for Billiton. At the close of November the available Dutch stock of Banca tin was estimated at 134,283 ingots, as compared with 95,832 ingots at the close of November, 1871. The Dutch stock of Billiton was estimated at the close of November at 19,300 ingots, as compared with 17,800 ingots at the close of November, 1871. The deliveries of Banca upon the Dutch markets for the first ten months of this year were 96,327 ingots, as compared with 183,008 ingots in the corresponding period of 1871. At Paris, Chilean copper in bars, delivered at Havre, has made 89*per ton*; ditto in bars at Paris, 89*per ton*; ditto in ingots, 94*per ton*; English tough cake, 94*per ton*; and Corocoro minerals (pure standard), 87*per ton*. At Marseilles, Toka for consumption has realised 84*per ton*. At Paris, Banca tin, delivered at Havre or Paris, has brought 156*per ton*; Straits, delivered at Havre or Paris, 146*per ton*; and English, delivered at Havre or Rouen, 150*per ton*. At Paris, French lead, delivered at Paris, has realised 22*l. 12s.* per ton; ditto Spanish, delivered at Havre, 22*l. 4s.* per ton; English, delivered at Havre, 22*l. 12s.* per ton; and Belgian and German, delivered at Paris, 22*l. 16s.* per ton. Silesian zinc, delivered at Havre, has been quoted at 24*l. 12s.* per ton; ditto other good marks, delivered at Havre or Paris, 24*l. 12s.* per ton.

The aspect of the Belgian coal trade remains the same, although there is a general impression that the close of the present year will witness a retrograde movement in the excessive prices of the day. These prices are considered to be in excess of those of other coal-producing countries in Europe, and influence in a prejudicial—not to say disastrous—manner Belgian industry generally, especially as regards the external competition which it has to sustain. In proof of this we may refer to the fact that it has been decided to put out 50 glass furnaces in Belgium; the proprietors of glassworks have already taken measures for carrying out this arrangement. There is a great volume of water in the Belgian rivers and canals, in consequence of continued rains; if these rains do not cease, the results may be very serious in the industrial districts of Belgium. The Canal de Fond-Piquette Colliery Company, at Vaux-sous-Chevremont, in the Liège district, has just cut a bed of good coal, 40 inches in thickness. This discovery is, of course, of some importance. Quotations for coal have experienced scarcely any variation in Belgium. Coke is still obtained with considerable difficulty.

In France there has been very naturally a good deal of talk of late as to the remarkably continuous rains, which have led to inundations. All the water-courses are at an extraordinary height, and many works possessing hydraulic motors have been obliged to slacken operations, while others have been compelled to suspend them altogether. Fortunately, perhaps, this is usually a quiet period of the year, and comparatively little business is done, so that the check which production may be said to have experienced will exert no influence upon the market. Such industrial establishments as the inundations have not interrupted are working with a fair amount of activity to fulfil former engagements, and their proprietors do not express much uneasiness at the slight falling off which is noticed in orders. The floods have unhappily interrupted the regular delivery of coal, and the railway companies, notwithstanding all the efforts which they have put forth, have not been able to wholly make good the disorganisation which has resulted in the ordinary course of business. The Eastern of France Railway Company is said to place at the disposal of Prussian colliery proprietors all the *materiel* which the industrials require, but the Prussian authorities, it is affirmed, deal at pleasure—that is, arbitrarily—with the trucks which cross the frontier. There is little change to report in quotations; the few transactions concluded have been affected at former rates. Rolled coke-made iron brings 14*l.* to 14*l. 8s.* per ton, and machine ditto, 17*l. 4s.* per ton. As regards pig, prices are maintained, but with some tendency to weakness. At Paris the local demand for iron is feeble, but there has been a tolerably good enquiry upon provincial account. Rails continue in considerable demand. Plates, which are very scarce, bring 19*l. 4s.* to 20*l. per ton*.

Prices of coal continue well supported in France, but there can be little doubt that a fall in quotations is imminent. The sugar works will soon have completed their season; the winter is not very rigorous. Some domestic economy is dictated by the present high price of coal, and the orders reaching the various consuming districts show a check. All these circumstances taken together induce the conclusion that contracts for future deliveries will be concluded at sensibly lower rates. On the other hand, there are not wanting those who point to the insufficient supply of trucks which still prevails upon the French railways, to the frosts which may interrupt navigations, and to the insufficient amount of labour and means of extraction available in many collieries; but, notwithstanding all that can be urged to the contrary, it seems probable that the production will soon be equal to the consumption, and that, in consequence, the selling price will descend to a more normal level. The production of coal is daily increasing in France, and there seems little doubt that in a few years the extraction will be doubled. There are now 16,112 working people engaged in coal mining in the Loire basin; the extraction of coal is now carried on at 82 pits. The Syndical Chamber of French Coal Merchants has been complaining of the delays attending the execution of contracts concluded before the rate advanced in quotations. The Pontgibaud Mines Company has been paying this month the balance of the dividend for 1871-2 of 1*l. 4s.* per share.

There is more hesitation than ever in the Belgian iron trade. Prices are still maintained, however, tolerably well, notwithstanding the inevitable slackening in affairs at this season of the year, but, upon the whole, fall in quotations seems probable. The aspect of affairs will, no doubt, experience a change in proportion as orders are worked off, and in proportion as ironmasters find it necessary to replenish their order-books. The present aspects of the Belgian iron markets are transition and liquidation more than anything else. What is most important is to enquire what are the chances of a revival of affairs at present prices. It is clear that these chances do not count for much. Belgian pig still maintains itself well, but it must soon feel the influence of the fall in English pig. Merchants' iron is still dealt in at 12*l. 16s.* per ton, but many industrials admit that there is little hope of maintaining such a price much longer. Plates have seriously declined in price in Belgium, having fallen from 18*l.* to 16*l. 16s.* per ton. English plates have been formidably competing of late with Belgian, being delivered free at Antwerp at 16*l. per ton*. In rails there has been very little business done in Belgium of late; many contracts proposed have not been carried through, as producers endeavour to maintain prices firmly, while purchasers seek to obtain easier terms. As regards adjudication of rails for the Belgian State lines, nothing has been done at present; it is understood that the *cahier des charges* is being modified, in order to take due account of the complaints of industrials. English contracts are stated to be in course of regular execution in Belgium. The Châtelet Rolling Mills Company will pay a dividend for 1871-2 on Jan. 2.

**IMITATION RUSSIAN SHEET-IRON.**—An improved process of manufacturing sheet-iron has been patented by Messrs. ROGERS and BURCHFIELD, of Pennsylvania, U.S. A good quality wrought-iron is made into sheet. A sheet of this iron is then coated, or otherwise completely covered, with particles of charcoal. Another sheet of iron is then laid upon the first sheet, and in like manner covered on its upper surface with similar particles of charcoal, and thus continuously sheet is placed upon sheet, until a pack is formed consisting of about 40 sheets. The edges are then clamped, and the pack is placed in a heating-furnace. Then, around the edges of the pack wood, which has been thoroughly soaked and saturated with water, is placed. Then the mouth of the furnace is closed, and a fire is made. After the iron has been subjected to the action of the heat, smoke, and gases of the furnace, until each sheet in the pack has become red, the pack is removed from the furnace, and subjected to the action of a steam-hammer. The sheets are then re-packed. The pack is again subjected to heat, and after being sufficiently heated is

removed, and again subjected to the hammering or equivalent force. This packing, heating, and hammering process is repeated four or five times, and the sheets are then finished.

## EMMA SILVER MINING COMPANY.

An important document has been forwarded to the shareholders by the directors, in the shape of a long letter written by Mr. George Anderson, the Chairman, who has recently returned from the mine, describing the condition and prospects of the property; and the statement cannot but be considered highly satisfactory, since it is shown that arrangements have been made for more efficiently working and exploring the mine for getting out ore in larger quantity, and for guarding against such accidents as last year; that arrangements have been matured for the regular sale of the ore, and contracts have been made for nearly 9000 tons; that their title has been vindicated and strengthened, and the litigation that so damaged the stock of the company has been gained, its continuance on appeal ended, and all other probable litigation prevented, at a price fairly compensated by the additional accommodation of a new tunnel to the mine. A railway has been commenced, which in less than a year will dispose of the canyon road difficulty, give regularity to the transport of ore, and save the mine upwards of 20,000*per annum*.

With regard to the state of the mine, Mr. Anderson reports that he found that with plenty of ore in sight their means and appliances were such that the slightest hitch or accident at once reduced their output, which could, therefore, never be kept up with any approach to steadiness; but till the course of the vein was better known it was not prudent to go to much expense in shafts, which might be in great part dead work. About 40 ft. of the lowest level had been cleared by means of his second visit to the mine, and he got to within 30 ft. of where Mr. Brydges Willys found very rich ores. The samples he took proved to be even richer, two of them running to \$2005 and \$2532 per ton. These were small samples picked for richness, and by no means indicate the average of the vein, which was large and promising. Too much must not be made of them, but they give fair ground for the expectation that as they go lower they will find the ore of a richer grade. The real difficulties of the mine arise from its situation and climate; the proximity of the highest peak of the Wahsatch range seems to cause more snow to fall there than anywhere else, and, consequently, all outside work gets greatly interrupted by it. Under such circumstances great allowance has to be made for the management. For instance, when he left they had to get a boiler taken up on the canyon for the engine.

They had to erect a new ore-house, and make a wagon-road at the Illinois Tunnel in order to make it available for output. The constant snows they have had since must have interfered sadly with this work, and may be the reason why the production has not been up to their expectations, as the same weather which prevented their building the new ore-house would drive them away from the horse-whim shaft. When the above work is done he sees nothing else to interfere with a full output, unless it be the canyon road, and in all probability by this time they have the snow frozen and a good winter road established over it. They have a long winter before them, and a bad climate, but he thinks all has been done that could be to guard against a repetition of last year's calamities. Mr. Anderson expresses regret that the shareholders have learned to depend on the weekly telegram arriving every Tuesday morning with unfailing precision, and that the slightest delay affects the price of the shares. It should be remembered that its arrival depends not only on no over-crowd on the ocean cable, but also on prompt transmission over 2000 miles of land wires, which are far more liable to accident; a small delay ought not to have a serious meaning at once attached to it.

Referring to sales of ore, Mr. Anderson states that at present the ore they sell goes to Chicago, St. Louis, San Francisco, and other places, at considerable cost of transport, which prevents their saving the whole of the carriage they used to incur in sending it to Liverpool. They have made contracts for 1000 tons a month for six months of the ordinary ore they have been getting since the cave, running about 70*oz.* to the ton; also for 300 tons per month for eight months of ore exceeding 100*oz.* per ton. These contracts are at fair prices according to the assay; they will greatly reduce the quantity they have to find a market for, and will help to secure the regularity of dividends. There is still no immediate prospect of realising the large sum lying on the dump in the form of second-class ore, but if smelting goes on developing as it has been lately doing he has not the least doubt that before long a good market will spring up for it, and at better prices than could at present be got out of it in any way; he believes it will gain its interest by keeping, and though it would be very convenient to have the money in hand, its lying unrealised is not a thing that ought to cause any uneasiness.

In the litigation with the Illinois Tunnel Company the Emma Company got the verdict, giving them the ore in dispute, with \$5000 damages, and making the injunction perpetual, and they bought the Tunnel, and so precluded appeal.

Messrs. Park and Stewart, the vendors of the Emma Company, who are both lawyers of eminence (Mr. Stewart admittedly the best mining lawyer in the United States), and accustomed to be paid very large fees, have on both trials sacrificed all other business, and carried both cases to a successful issue entirely without fee, and have not even charged their travelling expenses. The price to be paid for the Tunnel is that the Emma Company forego damages, and pay \$100,000 (about 13,000*oz.per annum*; and on the other hand, even at half present rates, the line is likely to be very profitable to its promoters also; so that, although the advantages to the mine first prompted them to go into the scheme, they do not think they have run any serious risk in doing so.

## FOREIGN MINES.

**CAPE COPPER MINING COMPANY.**—At a meeting on Wednesday the directors declared a dividend of 2*s.* per share, payable on Dec. 24.

**SIERRA BUTTES GOLD MINING COMPANY.**—At a meeting on Dec. 5 the directors declared an interim dividend of 2*s.* per share, free of income tax, on Original Sierra Buttes shares, payable on Jan. 10.

**FLAGSTAFF SILVER MINING COMPANY OF UTAH.**—At a meeting on Wednesday the directors declared the eleventh monthly interim dividend, at the rate of 5*s.* per share (30 per cent. per annum), which will be paid on Dec. 23.

**INDEPENDENCE GOLD QUARTZ.**—A telegram from the superintendent at the mine announces that the boarding-house, provisions, wood, and magazine have been destroyed by fire; the new machinery is safe. The directors have telegraphed to the company's agent at San Francisco, desiring him to proceed to the mine, and to report by cable as to the amount of damage done.

**EMMA.**—Telegram from Salt Lake City, Dec. 9: Raised 430 tons of first class ore this week; 470 tons first-class ore at railway depot; 500 tons first-class raised ore at mine; sold 330 tons.

**SNOWDRIFT (Silver) MINING AND REDUCTION.**—The third shipment of Snowdrift ore, about 9 tons of 2240 lbs., has just been assayed prior to sale at 274 ounces 8*dwt.* per ton, and the value will be about 65*s.* per ton.

**CAPE COPPER.**—The directors have received despatches per European:—New pump work had arrived at Oskiepie, and was being fixed; the completion of this will interrupt work in the engine-shaft for a short time, probably about ten days.—Railway: Traffic for the fortnight ending Oct. 19, 16*tons* up and 39*tons* down. Bills of lading are received for 313 tons per Laura. Since last report 300 tons of regular and 400 tons of ore, ex Tacna and Galata, have been sold by private contract, at 16*s. 6d.* per unit. The 980 tons, ex Gianfron and America, sold yesterday, by public ticket, at 16*s. 7d.* per unit, realising 25,000*oz.*

**HUDSON (Gold).**—S. O. Brown, Nov. 16: In the completion of the works I have practised the utmost economy, and have refrained from creating any expense that could possibly be avoided, with one exception, and that was the development of the "spur" of the mine through the Dunne shaft, but I am sure you will be more than satisfied with my course in keeping two men at work there until the 8th inst. when I tell you that the work done has disclosed a vein of very grade quartz. It is of a very fine grain, has sulphurets very evenly disseminated through it, and no piece which I have tested has failed to show free gold. Though I have not yet had any tests made by assay, I feel sure the rock will go from \$40 to \$60 per ton. Old prospectors here, who are expert at "honing out," call it a \$50 prospect. At present the ledge proper is about 2*ft.* in width, but about 1*ft.* of the footwall "gouge," which is a sort of silicified porphyry, carrying a large proportion of oxide of iron, will show as big a yield of free gold in the "horn" as the quartz. I am down about 38*ft.* only, with a drift from bottom of the shaft to the north-west, or toward the mine ledge, of 15*ft.*

We started taking out the water from the main shaft on the 8th inst.; so thoroughly had the adjacent country rock become saturated that we ran the tank day and night almost continually until yesterday, when the water suddenly subsided in a great measure, and we touched bottom. The vein at the bottom is 4*ft.* wide, and looks very promising. The "ribbon" quartz which occurs in the vein next to the footwall is wider at the bottom, evidently pitching to the north, and the vein generally carries a much greater proportion of sulphurets. I find that some 300*ft.* north from the shaft the top rock shows free gold, and from the character of the spur and the appearance of the ribbon quartz in the main shaft I think the directors may rest assured that a valuable chimney of rich ore exists to the north of the present workings, though not too remote to be advantageously worked through the present opening.

**FLAGSTAFF.**—Mr. N. M. Maxwell, under date Nov. 9, writes—The 25*feet* level below adit has been driven east and west 150*feet* each way, and winzes have been risen from each end, to communicate with adit, all in good ore, none of which we shall have any need to stop away for some time to come to supply the three furnaces. The shaft is still poor in the bottom, and presents exactly the same appearance as it did before we came upon the large run of ore ground above; there are about 3*feet* of vein matter, consisting of oxide of iron intermixed with spots of galena, and in the last 4*feet* sinking a change has taken place, which leads us to believe that we are just about to come upon another run of rich ore. I will advise you by wire when we do (the directors have since received the following telegram:—"Cut good ore in shaft"); in the meantime we are sinking as rapidly as possible. We have now two mules and a whimsey working underground, and are pushing on the 25*feet* level and sinking the shaft with full cores. The upper levels are being extended east and west in good ore ground, and the stopes are capable of turning out 70 to 80 tons per day without unduly forcing them. We calculate that there is now cut out and ready for stoping over 26,000 tons of ore, which is equal to about 12 months work at the above rate of exhaustion; this we hope to increase from time to time, so as always to keep a good reserve in case of coming upon poor places in the lode, which must occur in all metallic mines, and for which provision in the shape of reserves should always be made when the opportunity exists. The tram road from the mine to the ore-house we shall be able to keep working continuously; we have had already two falls of snow, one 3*feet*, and the other 4*feet*, on the level, but, by keeping the tram running over the road, we have succeeded in keeping it open; should we fall in this herafter we can use stone boats, and send down all the ore we require to the ore house. A double wire-rope is now being used, with a substantial 9*ft.* drum; it is an excellent and easily-governed arrangement, and a great improvement on the single hempen rope, which was dangerous and ineffectual.

for the large quantity of ore the mine is now capable of producing. We can keep all the furnaces going through winter if the ore can be got over the road, and this must be done one way or another. In course of a fortnight I will send a detailed report upon the furnaces, their working, fuel, &c.

**BATTLE MOUNTAIN.**—On Nov. 21 Capt. Richards reports:—Virginia, lode is smaller, and consequently does not produce so much ore as before. The 113*ft.* level, being driven north, is producing no ore, but the ground has made a change, I think, for the better, and I am under the impression that if this level is continued north we shall in time open up some good ore ground. The 73*ft.* level is very promising, producing some very fine stones of ore, which seem to be best in the bottom of the drift. We shall shortly sink on this lode to ascertain its extent. The stopes are without change, and are yielding fairly. We have raised 410 sacks during the week.

**BENSBERG.**—J. W. Hoffmann, Nov. 30: November has been a very wet month, and we have had no less than 23 rainy days out of the 30; the earth is harder worked. We were chiefly occupied during the month in clearing fresh face ground and getting carbonate from the open-cast. The number of hands employed was 70 to 72, of which 18 to 20 were engaged with the new building and fixing plant. On Nov. 15, we invoiced 179 tons of ore to the Stolberg Company, the value of which was 126*fls.*; since then we have delivered 50 tons poorer ore, of 200*fls.*, 210 tons were carbonate, and 19 tons dressed ore. The carbonate was got from the west end of the open cast, where it appears at a thickness of from 2 to 7 feet, and extends further to the west beyond the open-cast. There is about 15 feet of sand to remove before getting at the bed, and this will form very good work for the winter months; we have not been able to commence at it yet, as it would interrupt us in our washing and dressing, the space being occupied by our water-tanks, gutters, and washing drums, but which will be removed when our dressing machinery is ready for work. Besides the ore delivered, we got about 150 tons of staff, which was laid aside for future manipulation.

—J. W. Hoffman, Dec. 7: There is little alteration to report since last week. The weather was more favourable, and we got on a little faster. The large boiler is brickled in, and can be fired next week. In moving surface stuff we met with a small bed of carbonate, from which we got last week's production. From other parts of the open-cast we got chiefly wash ore. I do not expect more than 60 tons production this month, as we have a large quantity of surface to remove, which contains little or no ore, and lies on the top of the bed of carbonate. Week's production of ore 40 tons, average 40*per cent.* assay; galena, 12*fls.* tons, average 10*per cent.* assay; none delivered; ready for delivery, 20 tons.

**PESTARENA UNITED (Gold).**—Thomas Roberts: Report for December: We have melted and consigned the gold obtained in the Val Toppa district for the month of November, amounting to 270 tons, 10*dwt.*, 17*gr.* from 589 tons of ore raised. Val Toppa Mine: In zero level we have commenced a new winze; the lode yields 6 tons per fathom, estimated at 12*dwt.* of gold per ton. In the end driving north and south of cross-cut we have an improvement. The end driving south on this lode, in No. 1 level, yields 8 tons per fathom, at 9*dwt.*, the new winze behind this end 5 tons, at 8*dwt.* of gold per ton. The two stopes north and south of old winze each yield 10 tons per fathom, at 9*dwt.* per ton. The stopes in back, north of cross-cut, yield 12 tons per fathom, at 7*dwt.* per ton. The ends of intermediate cross-cut 2 tons per fathom. In the end north of 4th cross-cut, on the new lode, we have a promising lode of quartz and auriferous pyrites. Stopes south of 4th cross-cut, on the new lode, at 12*dwt.* per fathom, at 7*dwt.* per ton. Stopes in bottom of flat lode, and stopes in back of this lode, suspended, not looking so well. Stopes in bottom, north of winze, on new lode, give 12 tons per fathom, at 8*dwt.* per ton; and south 10 tons, at 9*dwt.* The intermediate end, driving south under No. 2, on the great quartz lode, 12 tons, at 7*dwt.* Stopes in bottom 12 tons per fathom, at 12*dwt.* per ton; and on the flat lode 10 tons, at 8*dwt.* The end north of 1st cross-cut west, on the western part of the quartz lode, poor at present. —No. 4 Lode: The end south, on the slide, continues to let out water freely, and the water increases as we advance. In this level we have commenced a new cross-cut east, near the entrance of the level, with a view to reach the new lode.

[For remainder of Foreign Mines see to-day's Journal.]

**ANGLESEY, AND ITS FUTURE.**—We have been hitherto dealing for the most part with the retrospect of mining in Anglesey; and although many modern samples may be cited of successful mineral operations in that ancient section of the metalliferous district of the United Kingdom, a recent discovery "illustrating certainty" was wanted to prove how eminently the island is capable of supporting its historical prestige. What the

## THE COPPER TRADE.

Sales of furnace material by private contract were confined to 200 tons regulus at Liverpool at 17s., and a cargo of Cape ore at Swansea at 16s. 6d. per unit. About 600 tons of bars sold during the week, consisting of about 200 tons Lota at 8s. and 2s. 10s.; 300 tons Urmeneta, and good ordinary brands at 8d. and 8d. 10s.; and about 100 tons best marks at 8s. and 8s. 10s. per ton. It will be seen by the figures given below that the actual stocks of metal in Europe show an increase over previous month of about 3000 tons, but to partly neutralise this there is a diminution in the quantity chartered and afloat from Chili of about 1500 tons. In comparing the statistics of last inst. with Jan. 1 this year, the gross total gives a surplus of about 10,000 tons; but, however, the stock in Chili is included in the comparison, and assuming that the figures in Chili for 1st inst. be (as they probably will) identical or nearly so, with those of 1st ult., the surplus will then be reduced to about 3500 tons, and this in spite of an increased import of copper into Europe during the past 11 months of about 16,000 tons, which quantity represented the stocks held in other parts of the world, and now no longer available. Transactions in Australian were on a very moderate scale, and amount only to about 300 tons, from 8s. 7s. 6d. to 9s. cash and short prompt, nearly the whole being in Wallaroo, and at 90s. per ton. English smelters find rather more enquiry for manufactured. The following are the Government returns for the first 10 months of 1872, as compared with 1871 and 1870; and in order to show the quantity of metal imported, ore has been reduced as containing 15 per cent., and regulus 50 per cent. of pure copper:—

January 1 to October 31.

IMPORTS.	1872.	1871.	1870.
Copper in ore .....	Tons. 5,413	..... 5,929	..... 7,360
Ditto in regulus .....	12,708	..... 12,217	..... 18,995
Ditto in bars, cakes, ingots, &c. ....	38,089	..... 26,347	..... 21,059
	56,210	..... 44,493	..... 47,414
EXPORTS.			
Foreign copper .....	9,628	..... 14,249	..... 13,517
Raw English ditto .....	11,746	..... 11,438	..... 8,905
Manufactured ditto .....	7,726	..... 10,076	..... 13,297
Yellow metal .....	8,410	..... 10,833	..... 10,347
Brass .....	2,862	..... 3,024	..... 2,320
	40,372	..... 49,620	..... 48,386

N.B.—The returns for 1872 and 1871 are being made up a fortnight later as regards the imports, and the reverse for exports, no real comparison can be instituted between the figures for those years and for 1870.

The following were the stocks (estimated in pure copper) in the ports named, also the quantity of Chili chartered and afloat for same:—

	Dec. 1.
Liverpool, Chili—in ore, regulus, Jan. 1.	1872. 1871. 1870.
and barilla ... Tons. 1,193. 1,373. 1,566. 2,517. 7,010	
Swansea. Chili—in bar and ingot 9,574. 21,447. 21,688. 10,459. 16,617	
(Foreign copper, chiefly .....	
London .... Australian ..... 2,057. 6,882. 7,028. 2,799. 3,588	
English copper ..... 595. 358. 345. 587. 615	
Chili, bar, &c. .... 4,015. 172. 216. 3,440. 7,095	
Havre.... Other foreign ..... 575. Nil. 700. 880. 775	
Actual stocks ..... 19,309. 28,232. 31,543. 20,692. 35,700	
Chili, chartered and afloat ..... 11,403. 10,955. 9,414. 9,758. 9,110	
Gross total ..... 30,712. 39,187. 40,957. 30,450. 44,810	

Stock in Chili, including 1 month's estimated make ..... 10,750. 4,000. unknown. 9,500. 4,500

The following were the imports—Jan. 1 to Nov. 30:—

	1872. 1871. 1870.
West Coast copper into England and France ... Tons. 41,667. .... 34,078. 3,500	
Other foreign into London ..... 16,706. 8,625. 44,840	
Total ..... 58,373. 42,703. 48,340	

The direct imports from the West Coast of South America into England during the month of November, were equal to 4966 tons pure, into Havre 40 tons; and during the same period 2131 tons of foreign copper entered the port of London, making together a total of 7137 tons. The mails received here from Chili during November, advised charters for together 3752 tons against 1232 tons during November, 1871, and 3551 in November, 1870. During the present year, 40,570 tons have been so advised against 35,810 tons in 1871, and 42,360 tons in 1870.

JAMES AND SHAKESPEARE.

## COPPER ORES.

Sampled Nov. 19, and sold at Tabb's Hotel, Redruth, Dec. 5.

Mines.	Tons.	Price.	Mines.	Tons.	Price.
West Tolgus	81	£4 12 6	West Seton	43	£1 18 0
ditto	62	5 0 0	ditto	38	1 18 0
ditto	61	4 10 6	Crenver and Abraham	71	4 9 0
ditto	60	5 12 6	ditto	51	4 12 0
ditto	57	2 12 6	ditto	46	2 14 6
ditto	54	4 6 6	ditto	40	3 0 0
ditto	43	4 8 6	Wheat Seton	7	3 13 6
South Crofty	67	3 3 6	ditto	49	5 15 6
ditto	65	3 3 6	ditto	47	4 9 6
ditto	64	3 4 0	ditto	24	0 5 0
ditto	57	3 3 6	ditto	12	1 2 6
ditto	45	3 2 0	East Pool	54	2 13 6
ditto	38	2 4 0	ditto	47	2 15 6
ditto	5	7 17 6	West Bassett	36	5 1 6
Mellinar	73	1 19 6	ditto	28	10 7 0
ditto	71	2 1 6	Wheel Bassett	58	4 3 6
ditto	51	8 1 6	ditto	20	11 7 6
ditto	44	2 4 6	East Seton	59	4 11 6
ditto	21	3 13 0	South Dolcoath	33	5 7 0
West Seton	61	5 9 6	ditto	15	2 3 0
ditto	50	8 3 0	South Tolcarne	5	2 17 0
ditto	48	6 1 0			
TOTAL PRODUCE.					
West Tolgus	418	£1871 12 0	East Pool	101	£ 274 17 6
South Crofty	341	1067 7 0	West Bassett	62	451 16 0
Mellinar	260	876 15 6	Wheel Bassett	58	395 13 0
West Seton	240	1185 15 6	East Seton	50	228 15 0
Creaver & Abraham	208	795 18 0	South Dolcoath	48	208 16 0
Wheat Seton	139	538 10 6	South Tolcarne	5	14 5 0
Average standard ..... 1065 5 0	Average produce ..... 616				
Average price per ton ..... 44 2 0					
Quantity of ore ..... 1930   Quantity of fine copper 125 tons 11 cwt.					
Amount of money ..... 27910 1 0					
LAST SALE.—Average standard ..... £102 14 0	Average produce ..... 65%				
Standard of corresponding sale last month, £101 14 0—Produce, 6½%.					

## COMPANIES BY WHOM THE ORES WERE PURCHASED.

Names.	Tons.	Amount.
Vivian and Sons	213	£ 785 17 9
P. Grenfell and Sons	284	1756 8 6
Sims, Willyams, and Co.	312	1288 10 6
Williams, Foster, and Co.	271	1271 13 9
Mason and Elkington	284	1114 19 0
Charles Lambert	162	477 6 0
Sweetland, Tuttle, and Co.	403	1245 5 6
Total ..... 1930	£7910 1 0	

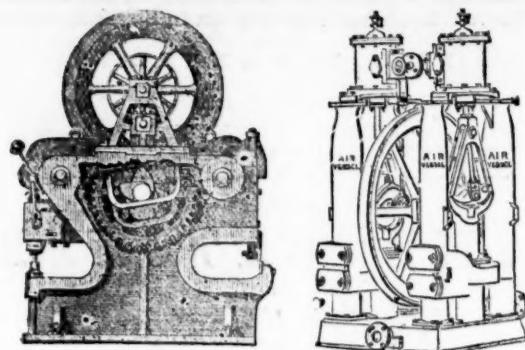
NO SALE on Thursday last, December 12.

Copper Ores for sale on Thursday next, at the Royal Hotel, Truro.—Mines and parcels.—Devon Great Consols 1130—South Cadron 429—Marke Valley 350—Hingston Down 300—Gawton Copper Mine 265—Glasgow Cardon 240—East Cadron 126—Phoenix Mines 151—Prince of Wales 118—Bedford United 110—Craddock Moor 94—Belstone 34.—Total, 346 tons.

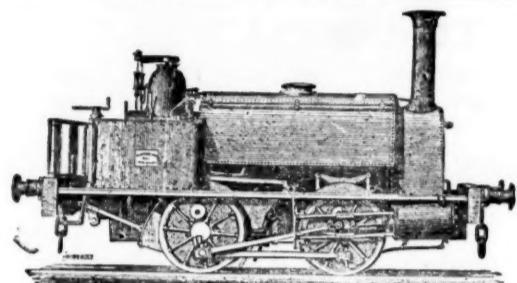
## COPPER ORES.

Sampled November 20, and sold at Swansea, December 10.

Mines.	Tons.	Produce.	Price.	Mines.	Tons.	Produce.	Price.
Cape Ore	71	32%	£25 1 0	Union Ore	60	6%	£25 2 6
ditto	70	32	26 2 6	ditto	41	15%	12 10 0
ditto	70	32	26 4 0	Berehaven	137	7%	5 10 0
ditto	70	32	26 5 0	ditto	146	9%	7 4 6
dito	57	26%	22 2 0	dito	92	9%	6 18 0
dito	86	26%	21 18 0	Knocknahan	123	8%	6 8 0
dito	65	26%	23 1 0	Brass Ashes	95	4%	0 15 0
dito	72	29%	24 1 6	dito	60	4%	0 12 0
dito	73	29%	24 1 6	Copper Reg.	9	47%	36 7 6
dito	91	29	23 18 0	Concordia	15	47%	37 9 0
dito	13	33%	27 12 0	dito	1	30%	23 11 0
dito	76	34%	23 12 0	dito	3	18%	13 10 0
dito	75	34%	28 9 6	dito	1	11%	9 4 0
dito	70	30%	25 1 6	Mam' Cop.	10	21%	16 8 6
dito	64	28%	23 6 0	peropolis	1	10%	21 1 6
dito	34	32%	27 0 6	Copper Reg.	26	20	14 17 0
Union Ore	80	63	4 18 0	Burnt Cop.	12	13	6 7 6
dito	80	63	4 16 6	Copper Ore	4	18	13 11 0
dito	65	6%	4 15 6	Cappagh	10	24%	18 2 0
dito	65	6%	4 15 6	dito	14	11%	8 4 6
TOTAL PRODUCE.							
Cape Ore	1017	£25,545 14 6		Concordia Regulus	20	£ 265 0 0	
Union Ore	39						

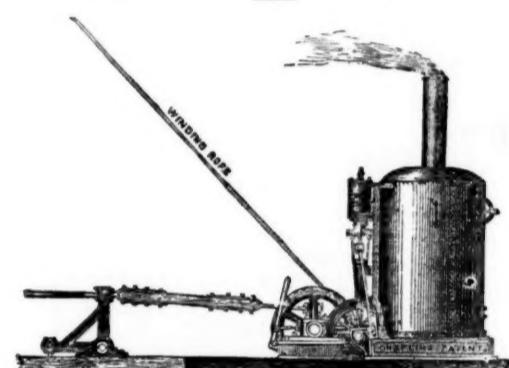


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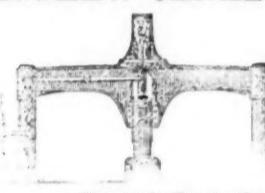
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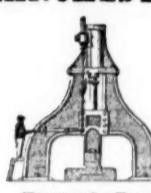
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The advantages of these furnaces are, in the first place, they effect a saving of from 25 to 50 per cent. in fuel.  
2ndly, The use and expense of grate-bars are dispensed with, as these furnaces have closed fire-places, formed in brickwork.  
3rdly, They make from 80 to 90 per cent. less ashes than open fire-grate furnaces.  
4thly, They have a purer flame, the combustion is more complete, and contains less free or unmixed air or gases.  
5thly, The workmen have much less labour in working these furnaces.  
6thly, They heat quicker, and are more under the control of the furnace-men.  
7thly, They are not affected by the position of the wind or draughts.  
8thly, The mills and workshops are cooler and more comfortable than where the open fire-grate furnaces are used.

For prices, and other information, apply to J. M. STANLEY, 27, Change-alley, Sheffield.

# BURLEIGH ROCK DRILLING MACHINERY.



Specially Applicable,  
TO  
**SINKING,**  
**QUARRYING,**  
AND  
**MINING PURPOSES.**  
**THE BEST & ONLY**  
**PRACTICAL DRILL.**

IT DOES NOT GET OUT OF ORDER.

PROGRESSES through Aberdeen granite at the incredible rate of 10 inches per minute.

SAVES £5 a day as compared with hand labour, independent of the enormous saving effected in the general expense, such as PUMPING, VENTILATION, INTEREST OF CAPITAL, &c., from the fact of the "put out" being increased four-fold.

DRILL POINTS.—The saving in steel alone is considerable. One drill will go through 20 feet of Aberdeen granite without sharpening.



Machine and Stand for Quarrying and Sinking.

## PRIZE MEDALS:

Royal Cornwall Polytechnic Society,  
August 21, 1872.

Liverpool and Manchester Agricultural Show, Sept. 12, 1872.

Middleton Agricultural Show, Sept. 18, 1872.

**THOMAS BROWN,**  
PATENTEE AND SOLE PROPRIETOR.

Orders received and executed solely by—

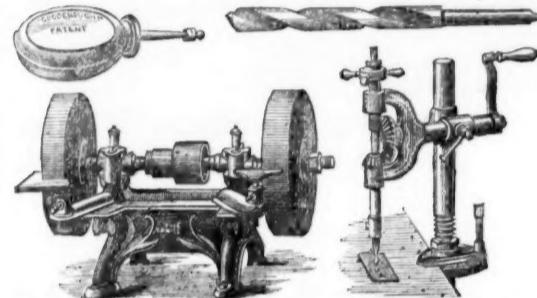
**CHAS. BALL & CO., SOLE AGENTS,**  
FOR GREAT BRITAIN AND IRELAND.

Office: 21, NEW BRIDGE STREET,  
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## CHARLES CHURCHILL AND CO., IMPORTERS AND FACTORS OF AMERICAN MACHINERY AND TOOLS,

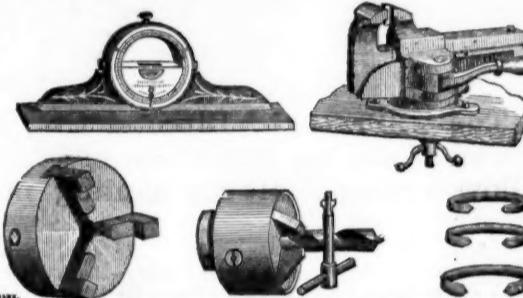
28, WILSON STREET, FINSBURY, LONDON, E.C.



SOLE AGENTS FOR  
Morse's Twist Drill, and Machine Company's celebrated Twist Drills and Chucks; American Scroll Chucks; Stephens' Patent Vices; Parker's Patent Parallel and Swivel Vices; Gould Manufacturing Company's Well and Cistern Pumps; Washita, Arkansas, and Hindostan Oil Stones; and all other descriptions of American Tools and Machinery, &c., &c.

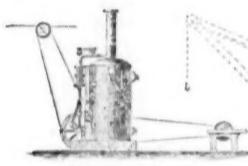
C. C. and Co. are prepared to give quotations and execute incidents for American Goods of all descriptions, to be shipped to any port.

CATALOGUES AND PRICES CURRENT ON APPLICATION.

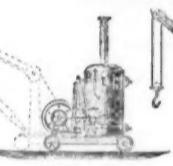


## CHAPLIN'S PATENT PORTABLE STEAM ENGINES AND BOILERS.

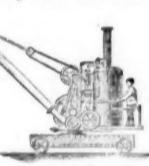
PRIZE MEDAL, INTERNATIONAL EXHIBITION, 1862.



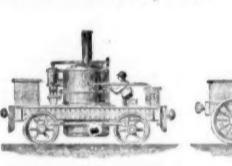
STATIONARY ENGINE,  
From 1 to 30-horse power.  
No building required.



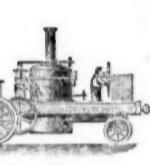
PORTABLE HOIST,  
1 to 30-horse power.  
With or without jib.



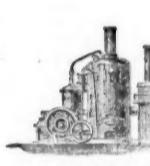
STEAM CRANE,  
20 cwt. to 30 tons.  
For wharf or rail.



CONTRACTORS' LOCOMOTIVE,  
6 to 27-horse power.  
For steep inclines and quick curves.



TRACTION ENGINES,  
6 to 27-horse power.  
Light and heavy.



SHIP'S ENGINES,  
Winding, Cooking, and Distilling.  
Passed by Government for half water.

\* These cranes were selected by H.M. Commissioners to receive and send away the heavy machinery in the International Exhibition.  
From the STRENGTH, SIMPLICITY, and COMPACTNESS of these ENGINES they are extensively USED for GENERAL PURPOSES, and also in situations where STEAM-ENGINES OF THE ORDINARY CONSTRUCTION CANNOT BE APPLIED.

ALEXANDER CHAPLIN AND CO.,  
PATENTEE AND SOLE MANUFACTURERS,

CRANSTON HILL ENGINE WORKS, GLASGOW.

ENGINES OF EACH CLASS KEPT IN STOCK for SALE or HIRE, and ALL OUR MANUFACTURES GUARANTEED as to EFFICIENCY, MATERIAL, and WORKMANSHIP.

Parties are cautioned against using or purchasing imitations or infringements of these patent manufacturers.

AGENTS IN LONDON FOR THE SALE OF OUR MANUFACTURES: WIMSHURST AND CO.

Oswald Brooke and Co.,  
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PATENTEE AND SOLE MANUFACTURERS  
OF  
GOVERNMENT  
FIREPROOF  
BRATTICE CLOTH  
AND  
AIR TUBING.  
WORKS: COLLYHURST.

BOHLKEN'S Improved PATENT EARTH BORERS.

THE BEST TOOL FOR BORING HOLES  
in the GROUND, to any depth, supplied in  
large quantities to CONTRACTORS, RAILWAY COMPANIES, BUILDERS, DOCKYARDS, &c., in GERMANY, RUSSIA, AUSTRIA, and HUNGARY.  
All sizes, from 2 inches to 18 inches diameter, kept in stock by the Patentee.

M. SELIG, JUN.,  
70 and 71, BISHOPSGATE STREET WITHIN,  
LONDON, E.C.



## THE DON ECONOMIC LUBRICATING OIL IS 40 PER CENT. CHEAPER THAN THE ORDINARY KINDS.

MR. ALFRED HEWLETT, of the Wigan Coal and Iron Company, says:—"I have used it for two years, and find it to answer exceedingly well for lubricating purposes."

MR. NASMYTH, the Inventor of the Steam-Hammer, says:—"I am highly pleased with it as a most effective and durable lubricant, having remarkable properties in the way of setting free bearings which had got set fast."

In face of these and hundreds of other letters to the same effect, it is a MERE WASTE OF MONEY to use the dearer kinds for the engines and machinery of collieries and mines, numbers of which are now using the Don Oil instead.

Any company desirous of trying it before adopting it may do so at our risk and expense.  
Circulars containing particulars sent on application.

PRICE—By the Ton of 253 Gallons, 2s. 6d. a gallon; by the Cask of 40 Gallons, 2s. 9d.

AGENTS WANTED AT HOME AND ABROAD.

DUNCAN BROTHERS,  
MANAGERS,  
DON OIL COMPANY, 2, BLOMFIELD STREET, LONDON, E.C.

## CHAS. PRICE AND CO.'S RANGOON ENGINE OIL, AS SUPPLIED TO H.M. DOCKYARDS AND FLEET.



THIS OIL is suitable to every kind of Machinery. As a lubricant it is equal to the best Sperm or Lard Oil, while it possesses the great advantage of being entirely free from any principle which will corrode the metal bearings.

For particular kinds of Machinery, the Oil may be specially prepared of a consistency and character adapted to the nature of the work to be done.

"Chemical Laboratory, 7, Printing House-square, Blackfriars, April, 1869.  
I herewith certify that the Rangoon Engine Oil, manufactured by Messrs. Chas. Price and Co., is free from any material which can produce corrosion of the metal work of machinery. It is indeed calculated to protect metallic surfaces from oxidation."

"The lubricating power of this oil is equal to Sperm or Lard Oil."

"T. W. KEATES, F.C.S., &c., &c.

Every parcel of the Oil sent from the work bears the Trade Mark of the Firm.

LONDON: CASTLE BAYNARD, UPPER THAMES STREET.

WORKS: MILLWALL, POPLAR; and ERITH, KENT.

# TANGYE BROTHERS AND HOLMAN,

## 10, LAURENCE POUNTNEY LANE, LONDON,

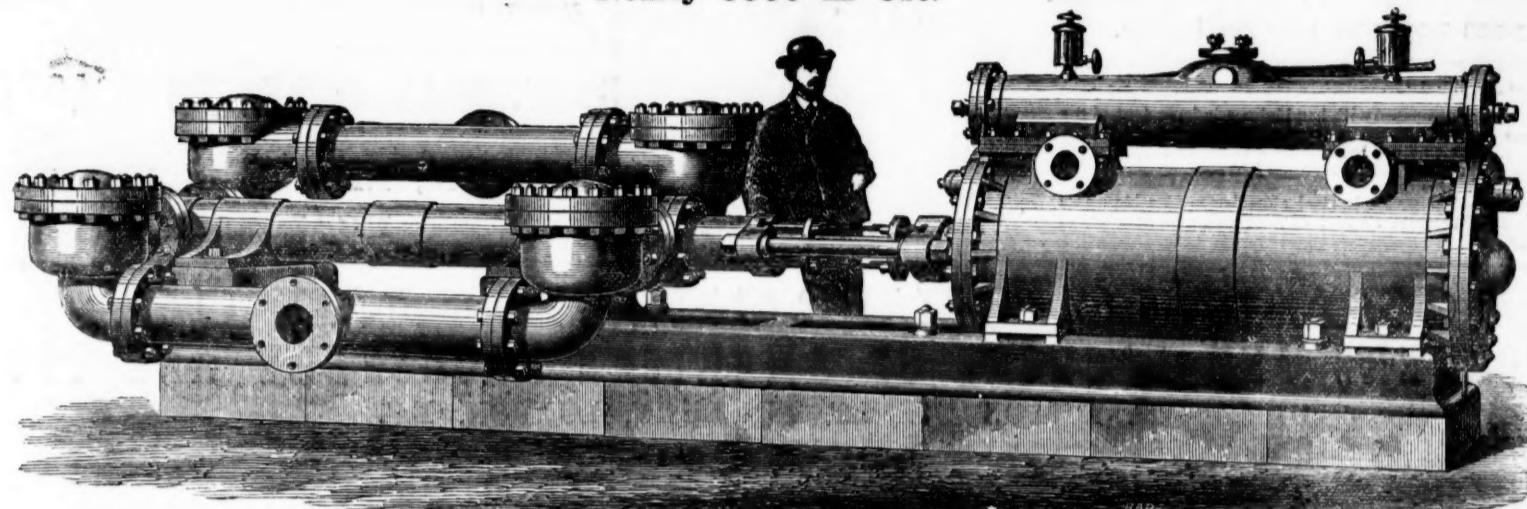
CORNWALL WORKS (TANGYE BROTHERS), BIRMINGHAM,

NEWCASTLE-ON-TYNE (TANGYE BROTHERS AND RAKE), OFFICES AND WAREHOUSE, ST. NICHOLAS' BUILDINGS.  
SOLE MAKERS OF

# THE "SPECIAL" DIRECT-ACTING STEAM PUMPING ENGINES

## FOR FORCING WATER FROM MINES.

Nearly 3000 in Use.



The "SPECIAL" Direct-acting Steam Pumping Engines require no costly Engine Houses or massive foundations, no repetition of Plunger Lifts, ponderous Connecting-rods, or complication of Pitwork, and allow a clear shaft for hauling purposes.

*Extract from "ENGINEERING," September 6th, 1872:*

"The accompanying engraving illustrates a large specimen of the 'Special' Steam Pump, which was brought before the public about four years since by Messrs. Tangye Brothers and Holman. The Pump is the invention of Mr. S. Cameron, of New York, and since its introduction Messrs. Tangye have turned out nearly 3000 from their works."

"These pumps are of various sizes, and at first only small ones were made, but as their usefulness became developed the manufacturers designed pumping engines on the same principle for use in collieries. They were first applied to this purpose in the Newcastle collieries about three years since, and through the efforts of the late Mr. A. Stansfield Rake, under the direction of Messrs. Tangye, about 130 of these pumps had been introduced—principally in the collieries of the Durham and Newcastle districts, up to the end of 1870. They were adapted to perform the required duty—varying in almost every case—of forcing from 1000 to 10,000 gallons per hour from depths ranging from 100 to 500 ft. The success of this system of pumps led Mr. J. Bigland, the manager of Messrs. Pease's Bishop Auckland Collieries, to conclude that it was adapted for yet heavier work. The result of his investigations into its working led to the manufacture of the engine we have illustrated, for the Adelaide Collieries, belonging to Messrs. Pease, at Bishop Auckland.

"The construction of the Special Steam Pump is so well known

that we need now do no more than refer to the dimensions of the various parts. The steam cylinder is 26 in. diameter, and the pump—which is double acting—is 6½ in. diameter, with a 6-ft. stroke. The slide valve is steam-moved, and its alternate action is effected by means of two steel reversing valves, operated by the piston in the interior of the cylinder at either end. Hence there is no external mechanism except the piston rod, a few inches only of which is seen reciprocating between the stuffing boxes of the steam and pump cylinders. In the contract it was stipulated that the engine should raise 120 gallons per minute 1040 ft. high in a single lift, and this is more than accomplished, with apparently as much ease as if its load was delivered at only 100 ft. high.

"The engine-room at the Adelaide Colliery is situated at a depth of 1040 ft. below the surface, and is an arched chamber, about 100 ft. long by 20 ft. wide, and 10 ft. high at centre. At the far end of this chamber is a double-flued boiler, 27 ft. long and 7 ft. in diameter. Placed between the boiler and the shaft is the pumping engine we have been describing. It was started on June 6, 1871, and Mr. Bigland reported that, having measured its duty, he found the average of seven trials to be 137 gallons per minute, thus giving a higher duty than was stipulated for in the contract.

"A still larger Special Steam Pump than the one already described

has since been made by Messrs. Tangye for Messrs. Stannier's Collieries, Silverdale, Staffordshire. The steam cylinder of this engine is 32 in. in diameter, and the water cylinder 10½ in.; the stroke is 6 ft., and the engine has to raise 22,500 gallons per hour 540 ft. high. Two out of eight engines for some extensive coal mines in Germany are also in a forward state; each of these engines is to be capable of raising 150 gallons per minute, or 9000 gallons per hour, 750 ft. high. This system of underground pumping engine undoubtedly carries with it the recommendations of simplicity and great power with a small number of mechanical parts. Its first cost is also very moderate, as compared with the method of raising water from greater depths by a series of 40 or 50 fm. lifts. Its practical value was tested in 1867 by the award of a silver medal by the Royal Falmouth Polytechnic Society, which is composed chiefly of mining engineers. In fact, these engines appear to solve a very important commercial question in mining operations—viz., the most economical and effective means of deep mine drainage. Their success has been established in the coal mines of Durham and Newcastle, and there is reason why their adoption should not follow, as occasion requires, in the copper and tin mines of Cornwall, some of which are of greater depth; and especially for foreign mines, where transport convenience and economy are of paramount consideration."

Pumping Engines are in use at the following among many other Collieries:

Adelaide Colliery, Bishop Auckland.....	3 Pumps.	North Bitchburn Colliery, Darlington.....	2 Pumps.	Stott, James and Company, Burslem.....	1 Pump.
Acomb Colliery, Hexham.....	1 "	Newton Cap Colliery, Darlington.....	1 "	Straker and Love, Brancepeth Colliery.....	1 "
Blackfell Colliery, Gateshead.....	1 "	Normanby Mines.....	1 "	Seaton Delaval Coal Colliery, near Newcastle.....	1 "
Black Boy Colliery, Gateshead.....	1 "	Oakenshaw Colliery.....	1 "	Thornley Colliery, Ferryhill.....	2 "
Castle Elen Colliery.....	2 "	Pease's West Colliery.....	2 "	Thompson, John, Gateshead.....	2 "
Carr, W. C., Newcastle.....	4 "	Pease, J. and J. W., near Crook.....	5 "	Trimdon Grange Colliery.....	1 "
Etherley Colliery.....	1 "	Pease, J. and J., Brandon Colliery.....	1 "	Tudhoe Colliery.....	4 "
Gidlow, T., Wigan.....	3 "	Pegwood Colliery, near Morpeth.....	2 "	Vobster and Mells Colliery.....	2 "
Haswell, Shotton and Easington Coal Company.....	3 "	Pelton Fell Colliery.....	1 "	Widdrington Colliery, Morpeth.....	5 "
Lochgelly Iron and Coal Company.....	2 "	Railey Fell Colliery, Darlington.....	1 "	Whitworth and Spennymoor Colliery.....	5 "
Lochore and Capeldrae Cannel Coal Company.....	6 "	Right Hon. Earl Durham, Fence Houses.....	1 "	Westerton Colliery, Bishop Auckland.....	1 "
Leather, J. T., near Leeds.....	2 "	Skelton Mines.....	1 "	Wardley Colliery, Gateshead.....	1 "
Lumley Colliery, Fence Houses.....	1 "	South Benwell Colliery.....	5 "	Westminster Brymbo Coal Company.....	2 "
Monkwearmouth Colliery, Sunderland.....	1 "	St. Helens (Tindale) Colliery.....	1 "	Weardale Coal and Iron Company.....	5 "

PARTICULARS OF THE "SPECIAL" STEAM PUMPING ENGINES SUITABLE FOR HIGH LIFTS IN MINES.

Diameter of Steam Cylinder.....Inches	6	8	10	8	12	16	10	14	18	21	14	18	21	26	16	21	2
Diameter of Water Cylinder.....Inches	3	3	3	4	4	4	5	5	5	5	6	6	6	6	7	7	4
Length of Stroke.....Inches	24	24	36	24	36	48	24	36	36	48	36	36	48	72	36	48	4
Strokes per minute.....	30	30	20	30	20	15	30	20	20	15	20	20	15	10	20	15	1
Gallons per hour.....	2,200	2,200	2,200	3,900	3,900	3,900	6,100	6,100	6,100	8,800	8,800	8,800	8,800	11,900	11,900	11,900	2
Height in feet to which water can be raised with 40 lbs. pressure per square inch of steam at pump.....	240	425	665	240	540	960	240	470	775	1,058	330	540	740	1,140	312	540	70
Diameter of Suction and Delivery.....Inches	2	2	2	3	3	3	3½	3½	3½	3½	4	4	4	4	5	5	5
Diameter of Steam Inlet.....Inches	2½	1½	1½	1½	2½	2½	1½	2½	3	3½	2½	3	3½	4	2½	3½	3
Diameter of Exhaust.....Inches	1	1½	1½	1½	2½	3	1½	2½	3½	4	2½	3½	4	5	3	4	9

PARTICULARS, &c.—Continued.

Diameter of Steam Cylinder.....Inches	30	18	24	30	32	18	24	30	36	21	30	36	42	26	36	44	5
Diameter of Water Cylinder.....Inches	7	8	8	8	9	9	9	9	10	10	10	10	12	12	12	12	1
Length of Stroke.....Inches	72	36	48	72	72	36	48	48	72	48	72	72	48	72	72	72	0
Strokes per minute.....	10	20	15	10	20	15	15	15	10	15	10	10	15	10	15	10	10
Gallons per hour.....	11,900	15,660	15,660	15,660	19,800	19,800	19,800	19,800	24,400	24,400	24,400	24,400	35,240	35,240	35,240	35,240	35,240
Height in feet to which water can be raised with 40 lbs. pressure per square inch of steam at pump.....	1,100	300	540	840	960	240	427	665	960	264	540	780	1,062	282	*540	800	1,000
Diameter of Suction and Delivery.....Inches	5	6	6	6	6	7	7	7	7	8	8	8	8	10	10	10	10
Diameter of Steam Inlet.....Inches	5	3	4	5	5½	3	4	5	6	3½	5	6	7	4	6	8	8
Diameter of Exhaust.....Inches	6	3½	5	6	6½	3½	5	6	7	4	6	7	8	5	7	9	9

PRICES OF THE ABOVE ON APPLICATION.

Any combination can be made between the Steam and Water Cylinders, to suit Height of Lift and Pressure of Steam.

**TANGYE BROTHERS & HOLMAN, 10, Laurence Pountney Lane, London, E.C.**